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ABSTRACT

"Exploring Careers" is a career education resource program, published in fifteen separate booklets, for junior high school-age students. It provides information about the world of work and offers its readers a way of learning about themselves and relating that information to career choices. The publications aim to build career awareness by means of occupational narratives, evaluative questions, activities, and career games grouped in fourteen occupational clusters. This eleventh of the series, "Health Occupations," presents an overview of jobs in health-related occupations, such as doctors, nurses and medical technicians. Narrative accounts focus on a registered nurse, a medical laboratory technologist, and a physical therapist, describing what they do and how they prepared for their careers. Exploring sections relate skills needed for these occupations to students' personal characteristics, and learning activities such as volunteering to work in a hospital of nursing home and taking a first aid course are suggested. A Job Facts section lists nature and places of work, training and qualifications, and other information for thirty-two health occupations, grouped in occupational clusters of medical practitioners, dental, nursing, therapy and rehabilitation, medical technologist, technician, and assistant, and other health occupations. ("Exploring Careers" is also available as a single volume of fifteen chapters.) (KC)

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Exploring Careers

Health Occupations

U.S. Department of Labor
Ray Marshall, Secretary

Bureau of Labor Statistics
Janet L. Norwood, Commissioner
1979

Bulletin 2001-11

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Exploring Careers is available either as a single volume of 15 chapters or as separate chapters, as follows:

The World of Work and You
Industrial Production Occupations
Office Occupations
Service Occupations
Education Occupations
Sales Occupations
Construction Occupations
Transportation Occupations
Scientific and Technical Occupations
Mechanics and Repairers
Health Occupations
Social Scientists
Social Service Occupations
Performing Arts, Design, and Communications Occupations
Agriculture, Forestry, and Fishery Occupations

Preface

Exploring Careers is a career education resource for youngsters of junior high school age. It provides the kind of information about the world of work that young people need to prepare for a well-informed career choice. At the same time, it offers readers a way of learning more about themselves. The publication aims to build career awareness by means of occupational narratives, evaluative questions, activities, and career games presented in 14 occupational clusters. *Exploring Careers* emphasizes what people do on the job and how they feel about it and stresses the importance of "knowing yourself" when considering a career. It is designed for use in middle school/junior high classrooms, career resource centers, and youth programs run by community, religious, and business organizations.

This is 1 of 15 chapters. A list of all the chapter titles appears inside the front cover.

Exploring Careers was prepared in the Bureau's Division of Occupational Outlook under the supervision of Russell B. Flanders and Neal H. Rosenthal. Max L. Carey provided general direction. Anne Kahl supervised the planning and preparation of the publication. Members of the Division's staff who contributed sections were Lisa S. Dillich, David B. Herst, H. Philip Howard, Chester Curtis Levine, Thomas Nardone, Debra E. Rothstein, and Kathy Wilson. Gloria D. Blue, Brenda Marshall, and Beverly A. Williams assisted.

The Bureau gratefully acknowledges the cooperation of all the workers who agreed to be interviewed and photographed, the teachers and students who field tested a sample chapter, and all who shared their ideas with BLS. Many people in the counseling community offered encouragement and support. Special thanks for her generous assistance go to Cathy Cockrill, Career Education Curriculum Specialist, Fairfax County Public Schools, Fairfax, Virginia.

Although they are based on interviews with actual workers, the occupational narratives are largely fictitious.

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Exploring Careers

Health Occupations

In addition to his work at a children's hospital, this pediatrician teaches at a medical school.

7

Exploring Careers

Luther Knight was nervous. The clock read 9:57, almost time for science class. That by itself didn't bother him; he enjoyed science. Occasionally Ms. Dombrowski talked too much and the students got fidgety. But Luther liked Ms. Dombrowski's course in general science, and the unit in biology they were doing now fascinated him. He planned to study biology in high school and then in college. And someday he would be a famous biologist. Every day he looked forward to science class.

Every day, that is, except today. Today Luther was nervous. Today he was scheduled to give a report to the class and very soon he would be standing at the front of the room and talking while 30 pairs of eyes watched him. Luther had prepared his report; he knew what to say. But the thought of all those eyes on him sent shivers up his spine.

Luther and his classmates sat down as the bell rang. A minute later, a woman entered the room. She moved quickly and gave an impression of barely contained energy. After dropping some papers on her desk, she went straight to the chalkboard and picked up a piece of chalk.

"Good morning, everyone," she began, getting straight to the point. "Monday, as you remember, we started talking about the science of health. Yesterday we got into the history of health care, and today we have individual reports on health occupations . . . " Ms. Dombrowski looked up. "I'm sure everyone is ready," she added with a wide smile.

Luther moved nervously in his seat as the teacher continued. "Before we hear the reports, though, let's review yesterday's discussion. What did we say about health care?"

Allison spoke up. "Caring for the sick is one of the world's oldest occupations. People have been doing it for thousands of years. But ways of taking care of the sick have changed a great deal. In the old days, health care was all mixed up with magic and superstition. Today, medicine is a science and medical researchers keep looking for better ways of treating illness and keeping people healthy.

"Many medical procedures, and many of the rules about good health that we take for granted, were discovered quite recently—after lots of scientific observation and research. Anesthetics to keep people from feeling pain and shots to protect them against diseases like smallpox or polio are such discoveries. *We* all know how important it is to keep wounds clean to prevent infection, but doctors didn't always know that. Centuries ago, operations took place in dirty surroundings; doctors didn't realize that the germs on a dirty scalpel might make a sick person even sicker.

"And," continued Allison, "new medical discoveries are taking place all the time. Some medicines and operations that are used today were unknown just 5 or 10 years ago!"

"Although the field of health care is very old," she said, speaking rapidly, "it's also very new. And advances in medical science are taking place so fast that the field is changing all the time."

"That's an excellent summary, Allison," said the teacher. "Now, what else can we say about health care? Why should we bother to learn about health occupations?"

Hesitating at first, Luis finally raised his hand. "Because some of us may want to become doctors and nurses when we're older," he said.

"Yes, of course, Luis," answered Ms. Dombrowski. "We've already learned that several million people in this country work in the health field, and that there are health careers of all kinds for people with different interests and abilities.

"Many of these jobs were created by the rapid developments in medicine that Allison just mentioned. Remember that many of the things that people in the health field do today would have been unimaginable 100 years ago. The health occupations as we know them today were "created" by such things as the invention of a new machine, the discovery of a new way of diagnosing illness, or the introduction of a better way of helping people take care of themselves. New occupations are emerging all the time, and quite possibly the health occupations of the future won't resemble the jobs we're going to hear about now."

Glancing at her paper again, the teacher continued. "We have eight reports to hear today, so let's go ahead with them. First is Toni Crowley, who will tell us about medical practitioners."

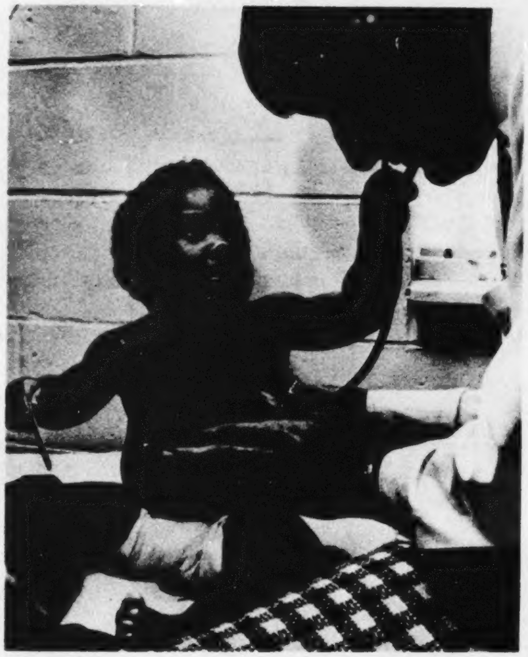
Medical Practitioners

Note cards in hand, Toni walked to the front of the room, faced the class, and began to speak.

"Medical practitioners, whom we usually refer to as doctors, are called that because they "practice" the profession of medicine. When they treat patients, their hardest and most important job is making a diagnosis—figuring out what's wrong and what to do about it. They usually start by taking a medical history and doing a physical examination, plus ordering whatever tests or X-rays seem appropriate. The results give them the clues they need to determine how sick someone really is. Coming up with the correct diagnosis can be hard if the patient is a baby who can't explain what hurts. Or if the disease is very rare, the kind doctors read about in textbooks but never expect to see. At any rate, diagnosing illness and prescribing the proper treatment take so much knowledge and skill that medical practitioners spend years and years going to school.

"Most medical practitioners are *physicians* and have a degree called a Doctor of Medicine, or M.D. Some physicians are *general practitioners,* doctors who see patients of all ages and treat all kinds of illnesses. But most physicians specialize. We're all familiar with some of these experts. On television we've seen *surgeons* operate. When our mothers were expecting us, they probably visited *gynecologists* or *obstetricians.* These doctors took care of problems related to the pregnancy, and delivered us when we were born. And many of us have visited *pediatricians,* doctors who treat children and youngsters. There are other specialists whom you may not have heard of. *Cardiologists,* for example, concentrate on diseases of the heart. *Neurologists* treat problems of the brain and nervous system. *Radiologists* specialize in using X-rays to find or treat illnesses. The list goes on and on. In fact, there are more than 30 fields of medicine in which doctors can take graduate training after they earn the M.D.

"There are other kinds of medical practitioners you've probably heard about. *Osteopathic physicians* help patients who have problems involving muscles and bones. They use hand manipulation as a form of treatment in addition to surgery, drugs, and other conventional medical treatments. *Chiropractors* deal with the nervous system, and treat patients by manipulating the spine. And *podiatrists* treat foot disease and deformities such as corns or bunions. They also take care of problems with the arch, or curve of the foot."



The diagnosis can be difficult if the patient can't explain what's wrong.

Surgeons must be able to make decisions in emergencies.

Toni looked up from her paper. "There are other kinds of health practitioners that I haven't mentioned," she said. "But they will be covered in other reports. Any questions?"

When no hands appeared, Toni returned to her seat. "That was very good, Toni," commented Ms. Dombrowski. "And now let's hear about another kind of health practitioner, the dental practitioner, or dentist. Sharon Dailey's report on dental occupations is next. Then Pilar Chavez will tell us about optical occupations. Sharon?"

As Sharon walked to the front of the room, Luther shifted in his seat. His ordeal was at least 10 minutes away. Maybe, if he was lucky, the other reports would take the whole hour and he'd be saved for today. But that was too much to hope for....

Dentists need talented hands as well as scientific ability.

Helping people select frames for their eyeglasses takes courtesy and tact.

Dental Occupations

"Dental workers," began Sharon, "are concerned with the teeth and gums. Many of us have gone to the *dentist* to have a cavity filled. But dentists do much more than that. They give us advice on taking proper care of our teeth. They examine teeth and gums for signs of disease. Depending on the problem, they take X-rays, straighten teeth, and treat gum disease. When necessary, they pull teeth and substitute false teeth, called dentures. Some of us have visited an *orthodontist*—a dentist who specializes in straightening teeth.

"When you visit a dentist's office to have your teeth cleaned, it may not be the dentist who does the cleaning. Dentists often employ *dental hygienists* to clean and polish teeth, take X-rays, and tell patients how to care for their teeth properly. Many dentists also have a *dental assistant* who makes the patient comfortable in the dental chair and helps the dentist by handing instruments and keeping the patient's mouth clean.

"There is one other kind of dental worker whom we rarely see, the *dental laboratory technician*. This is the person who makes braces, dentures, crowns, and bridges. If you wear braces, you probably remember what it was like when the dentist took impressions and measurements of your teeth. The technician used these to make the braces. Are there any questions?"

Since there were no questions this time, either, Sharon gave the floor to Pilar and sat down. Luther couldn't keep his eyes off the clock on the wall.

Optical Occupations

"Look around the room," began Pilar, "and notice how many people wear glasses. Quite a few. And some of you wear contact lenses. Who told you that you needed glasses? An *optometrist*, probably. Optometrists are medical practitioners and have extensive training, as do the other doctors Toni just told us about. But instead of being Doctors of Medicine they go to colleges of optometry and earn the degree of Doctor of Optometry. Optometrists examine their patients' eyes and may prescribe glasses or contact lenses to correct poor vision. When necessary, they can suggest other treatments, such as eye drops, that don't involve drugs or surgery.

Health Occupations

"Many optometrists employ an *optometric assistant* who helps them the way a dental assistant helps a dentist. Optometric assistants keep patients' records, make appointments, and do other office work. They also prepare a patient for an eye examination and help the optometrist perform it.

"When I was in fifth grade, the optometrist tested my vision and told me that I needed glasses. At the time, I never wondered where those glasses came from. But in doing the research for this report, I learned that an *ophthalmic laboratory technician* was the person who actually made my glasses. Sometimes these workers are called *optical mechanics.* Anyway, they start with a standard piece of glass, called a lens blank. Using precision tools, they grind and polish the blank until it fits the prescription. Then they mark and cut the lens to fit the frame.

"I remember the day my father and I picked up the glasses at the office of the *dispensing optician.* We had already been there once, to bring the optometrist's prescription and choose the frames. When the glasses were ready, they didn't fit comfortably. They felt funny on my nose and I didn't want to wear them. So the optician adjusted them for me. Besides fitting glasses, opticians help patients select frames. And they write up work orders that the technicians use to make glasses.

This surgical intensive care nurse has had to find her own way of dealing with serious illness and death.

"But what if you need more than just glasses? Fortunately, I don't. But many people have serious eye diseases that require medicine or surgery. These people go to an *ophthalmologist.* Also know as *oculists,* ophthalmologists are physicians—medical doctors who specialize in problems of the eye. Like other physicians, they are licensed to prescribe drugs or surgery to correct a problem."

Pilar looked around the room and asked for questions. Someone in the back had one. Luther didn't pay any attention; he was busy reading his report to himself, afraid he might be called next. His report was as good as the others, he told himself. There was nothing to be afraid of.... But everyone would be looking at him! What if he tripped as he walked to the front of the room?

"Thank you, Pilar," Ms. Dombrowski was saying. "Let's see, who's next?"

Luther crossed his fingers and held his breath.

"Greg Tanimoto has a report on nursing occupations," continued the teacher.

Luther relaxed. Greg was sure to give a long report; he always did.

Nursing Occupations

Standing confidently at the front of the room, Greg paused to get everyone's attention and then began to read from his note cards.

"When we think of health care," he said, "we think of nurses as well as doctors. We all know that nurses play a very important role in caring for the sick. However, there's more to nursing than that.

"Just think about Ms. O'Hare, the school nurse. Like many nurses, she devotes a lot of her time to health education—teaching us things about our eating, sleeping, and living habits that can make us healthier. She also gives us tips on how to keep from hurting ourselves."

"That's right! She talked to our gym class last week about the dangers of skateboarding," broke in Charlie.

"Yes," agreed Greg, a little startled by the interruption. Regaining his composure, he continued. "You may not know that people in several different jobs provide nursing care: Registered nurses, practical nurses, nursing aides, attendants, and orderlies. The differences among these workers boil down to training and responsibility. The more training you have, the more responsibility you can assume and the more decisions you can make about what kind of care the patient should have.

"In a hospital or nursing home, *registered nurses* supervise nursing care. They keep track of the patients' progress. They must know enough to be able to judge a patient's condition and tell if it is getting worse. If so, they must know exactly what action to take. Nurses see to it that the physician's orders are carried out and consult the physician when problems occur. But when emergencies arise, they may have to take charge and rely on their own training and experience to do the best thing for the patient.

"Training for this profession takes from 2 to 5 years, depending on the program. That's considerably more training than people in other nursing occupations have, so registered nurses often act as team leaders in providing patient care. With their extra training they have greater responsibility for the patient's health. They not only give shots, for example, but know what the medicine is for and what side effects it might have.

"*Practical nurses* help physicians and registered nurses by handling routine aspects of patient care. They take temperatures and blood pressures, change bandages or dressings, and give cetain medicines. Their training usually takes 1 year. Practical nurses must pass a special exam in order to use the title "licensed practical nurse" or LPN.

"*Nursing aides* also help with the daily routine in a hospital or a nursing home. They answer patients' bell calls, deliver messages, carry food trays into patients' rooms, and feed patients who are too sick to feed themselves. *Orderlies* and *attendants* escort patients to operating and examining rooms. These nursing occupations require the least training—from a few days to a few months—and that usually is provided on the job."

Greg looked up from his note cards. "That's it. Are there any questions?"

Somebody *please* ask a question, thought Luther as he counted the minutes remaining in this class period.

"I have a question," said Lisa. "You mentioned the school nurse and talked about nurses who work in hospitals. I have a cousin who works in the health unit at Consolidated Petroleum, so I know that nurses also work in business and industry. Do they work in other places, too?"

"Sure they do," said Charlie before Greg had a chance to reply. "They work in doctors' offices!"

"Right," agreed Greg. "And nurses work in other places that are a little less obvious. Many nurses and nursing aides work in nursing homes, rehabilitation centers, psychiatric hospitals, and mental health clincs. The atmosphere is different from that in general hospitals, which usually are pretty hectic places where the patients are extremely sick, but stay for only a short time. Patients in nursing homes and mental hospitals may stay for months or years. Progress can be very slow, and that requires a great deal of patience and encouragement from the nursing staff. These nurses must be good at dealing with people during a difficult period in their lives. They must be able to reach out and encourage people who feel sad and hopeless. In institutions where the patients need rehabilitation or long-term care, the human side of nursing is especially important. Sometimes a nurse is the patient's only friend.

"Community health nursing is something else you should know about," Greg continued. "*Public health nurses* run clinics that deal with health care needs in neighborhoods where people live—housing projects in rundown parts of the city, migrant labor camps, remote communities in the mountains or the desert. *Visiting nurses* care for people in their homes; often, their patients are elderly people who are too sick or weak to manage all by themselves. Visiting nurses usually travel by car and see many patients in the course of a day. They're on the go all the time, and no two days are alike. Community health nurses do other things, too. They organize neighborhood health programs and try to educate people about good health and sensible living habits. They may,

Visiting nurses are on the go all the time.

for example, help start a campaign to wipe out rats; bring in speakers to teach shoppers about the nutritional value of the food they buy; or teach youngsters about drug abuse."

Toni raised her hand. "When I was preparing my report, I came across the term "nurse practitioner." Can you explain that?"

Excellent, thought Luther. The more questions the better. Greg certainly was wound up about nursing!

"*Nurse practitioners,*" began Greg, "are registered nurses who have gone back to nursing school for advanced training that lasts 1 year or more. The additional skills they learn enable them to provide basic health care on their own. For example, some nurse practitioners run maternal health clinics—clinics for mothers and babies. They know all about common childhood complaints, and can handle ordinary illnesses so well that the mother doesn't have to take her baby to a physician. A few nurse practitioners have private practices—just as doctors and dentists do—and treat patients with routine health problems such as colds, sore throats, sprains, and broken bones. Nurse practitioners are trained to substitute for a physician in specific situations."

"Good job, Greg," said Ms. Dombrowski. "Now let's hear from Kevin about medical record occupations."

Medical Record Personnel

"Medical records are an important part of health care," Kevin began. "Medical records are nothing more than written information about patients, including their "medical histories"—what illnesses they have had and when, what doctors they visited, what treatment or drugs they've had, and so on. The records also contain X-ray reports, results of laboratory tests, and notes from doctors and nurses.

"Many people use this information. Of course, a doctor usually needs to know your medical history in order to treat you. But medical records serve other purposes, too. Researchers use them in looking for cures for diseases. National and State health agencies use them in developing public health programs. And insurance companies use them in setting rates for their policies.

"Medical recordkeeping is a complicated process because the information is so technical. To handle the job, hospitals and clinics employ several kinds of workers. *Medical record clerks* do the more routine tasks. They translate age and sex information into codes, for example, so that this information can be stored and easily retrieved when necessary. They also answer routine requests for files. *Medical record technicians* handle tasks that require more technical knowledge, such as reviewing records for internal consistency and cross-indexing medical information. In most hospitals, a *medical record administrator* directs the records department and trains the technicians and clerks. These workers don't take care of sick people the way doctors and nurses do, but they're health workers all the same. Are there any questions?"

Luther looked around the room hoping to see hands go up, but none did. He became nervous again as Kevin went back to his seat and Ms. Dombrowski looked at her list. Luther glanced at the clock. He was counting on the hour running out before his turn. Or would it be better just to get it over with and not worry anymore? No, giving the report tomorrow would be better than giving it today . . . .

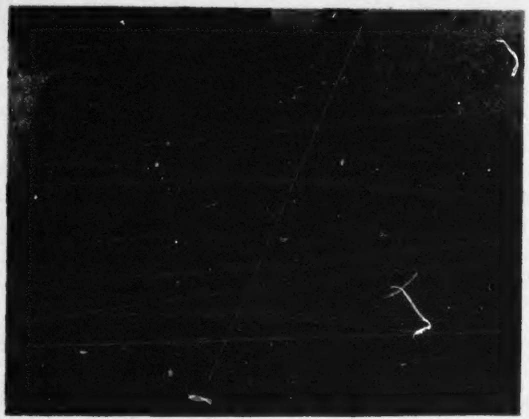
"Ramon Ramirez, let's hear your report on therapy and rehabilitation occupations," the teacher said suddenly.

So far, so good, thought Luther.

Therapy and Rehabilitation Occupations

"Think about the handicapped students in our school," began Ramon. "Some have obvious disabilities, such as blindness or a withered arm. Others have problems that aren't noticeable right away, such as hearing difficulty. But whatever the problem, many of these students learned to cope with their handicap through therapy.

"Therapists and rehabilitation workers help people with handicaps learn to move around, communicate, and go through everyday activities as normally as possible. With therapists' help, more handicapped people than ever before are managing very well in schools just like this one, in college, and in the world of work.



A speech pathologist is helping this little girl overcome her hearing problems.

"The largest group of therapists includes *speech pathologists,* who treat speaking problems, and *audiologists,* who work with hearing problems. Speech and hearing are very closely related, so a specialist in one field must know the other pretty well.

"I chose this topic for my report because of my cousin Maria," explained Ramon. "She was in a motorcycle accident last year and hurt her leg very badly. When she got out of the hospital, she couldn't use her leg at all—couldn't stand on it, or walk, or run. It was awful. But the *physical therapist* she saw every day helped Maria learn to use the muscles in her leg again. During her treatment sessions, she did exercises with special equipment and practiced "ordinary" things like climbing stairs. That wasn't an ordinary thing for her, I can tell you! It took a lot of determination on her part, and a lot of encouragement from the therapist, for her to get back the use of that leg. The therapist really inspired her when her spirits were low; I guess that's a very important part of the job.

"*Occupational therapists* also work with people who have trouble using their muscles. The difference is, while physical therapists help you use your muscles again, occupational therapists teach practical skills that make your life easier or make you feel good about yourself.

"I'll give you another example. When my grandmother had a stroke, she was paralyzed on one side and couldn't dress herself or eat without help. She even had trouble using the telephone. She was very upset about her condition because she hates to ask anybody to do things for her. But she's in a nursing home that has occupational therapy classes every day, and she is gradually learning to do simple things for herself again.

"Occupational therapists do a lot of their work with patients like my grandmother, people who need to relearn everyday skills because their muscles were damaged by illness or an accident. Some occupational therapists work with retarded or emotionally disturbed patients in mental hospitals. By teaching these patients simple skills like gardening or weaving, for example, they hope to give them self-confidence and help pave the way for emotional stability. And occupational therapists help mentally or physically handicapped persons prepare for a job by teaching them skills like typing or the use of power tools."

Ramon looked around for questions, but there were none. He took his seat while Ms. Dombrowski looked at her list.

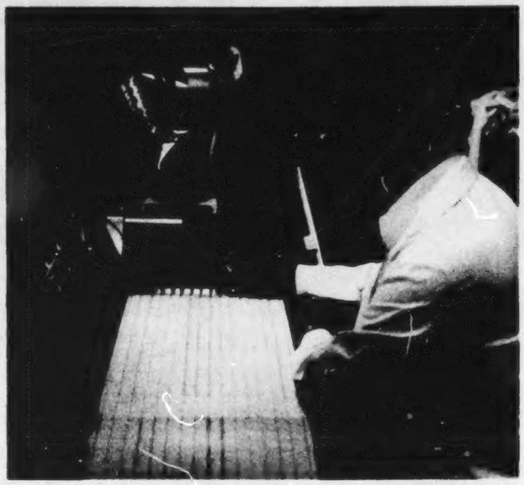
"We have two reports left," said the teacher, "Which shall we hear first?"

Luther looked at the clock—only a few minutes left. If he wasn't called now, the hour would run out. He'd be saved until tomorrow.

Physical therapists encourage their patients to keep trying, even when progress is slow.

This occupational therapist knows that putting a mosaic together is good exercise for stiff fingers.

Health Occupations



This technician operates machinery that records the electrical impulses in our brains.

Medical laboratory technicians perform tests that help physicians arrive at a correct diagnosis.

"Cathy Chan will tell us about medical technologists, technicians, and assistants," said Ms. Dombrowski finally. "And Luther Knight will be last with a report on other health occupations."

Bingo, said a voice in Luther's mind.

Medical Technologists, Technicians, and Assistants

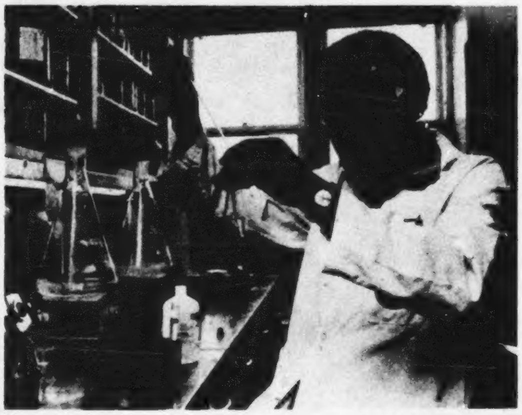
Cathy quickly took her place at the front of the room. After getting the attention of the class she started to read.

"There are many people besides doctors and nurses who help run a hospital or clinic. Among them are the technologists, technicians, and assistants. Some operate special kinds of equipment. The electrocardiograph, or EKG, for example, measures the rate and strength of a patient's heartbeat. It takes a specially trained *EKG technician* to operate it. Similarly, an *electroencephalographic technician* or *technologist* is needed to operate an electroencephalograph, or EEG. This machine records electrical impulses from a person's brain.

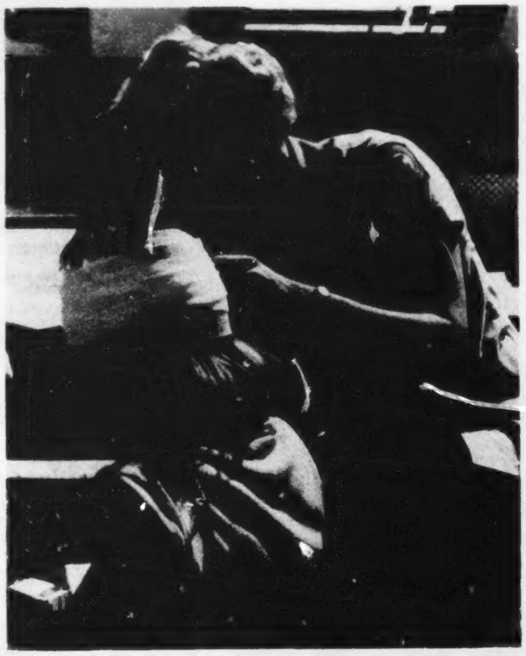
"For obvious reasons," Cathy said with a smile, "these workers usually are called *EEG technicians*. And next we come to the *radiologic technologist* who operates X-ray equipment."

Cathy paused to turn the page. At the same moment, a young man walked into the classroom. Luther thought he recognized him; he worked in the school office. Moving quietly along the wall so as not to disturb the class, he went up to Ms. Dombrowski and handed her a note. A minute later he was gone.

Cathy continued reading. "Other workers help in different ways. *Medical laboratory workers,* for example,



A patient's life might depend on this medical technologist's ability to work under pressure.



Emergency medical technicians must act quickly when they arrive at the scene of an accident.

perform tests that help doctors understand and treat diseases. With microscopes and other equipment, the laboratory workers analyze samples of blood, tissue, and fluids from the human body.

"Surgeons receive important help from *operating room technicians* before, during, and after surgery. Technicians help set up the operating room with instruments, equipment, and linens. They also prepare patients for surgery by washing, shaving, and disinfecting the parts of the body where the surgeon will operate. During surgery they hand the surgeon instruments, sterile pads, and whatever else is needed. And after the operation they move the patient to the recovery room and help clean up.

"Other medical assistants, *respiratory therapy workers*, treat patients who have breathing problems. Also known as *inhalation therapy workers*, they give emergency treatment in cases of heart failure, stroke, drowning, and shock. This treatment is very important to prevent brain damage when a patient stops breathing. Generally, damage to a person's brain occurs if the person has stopped breathing for 3 to 5 minutes. And after 9 minutes without oxygen, a person usually dies. It's no wonder that respiratory therapy workers are among the first medical specialists called for in an emergency.

"And speaking of emergencies, *emergency medical technicians*, or EMT's, specialize in handling them. They

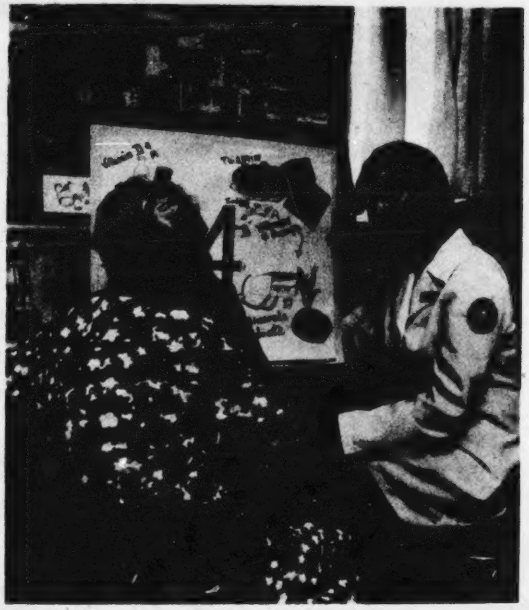
Members of a health team are oblivious to the outside world when they are fighting to save a life.

are called when someone has an automobile accident or a heart attack. They determine how bad the victim's illness or injury is and what emergency medical care is needed. Depending on the case, the EMT's may have to restore a victim's breathing, stop a wound from bleeding, give first aid for poison, or help deliver a baby. Whatever the situation, though, EMT's must work quickly. Their emergency care often means the difference between life and death."

Cathy looked around the room. "Any questions about what I've said?" she asked. No hands appeared, but this time Luther didn't care. There was only a minute left in the period, not enough time for him to give his report. He smiled to himself.

"Very good, Cathy," said the teacher, walking to the front of the room. "That leaves us with Luther's report. Normally we wouldn't have time for it, but your schedule has been changed today. The school office tells me that your next-period teacher, Mr. Borden, suddenly got sick and went home. They don't have a substitute, so for the next period you'll be with me. We'll hear Luther's report, then take a break. After the break we'll discuss the reports. Luther?"

Luther groaned and stood up. Trying to avoid the others' eyes he walked stiffly to the front of the room. There he turned around, looked down, and began to read. His eyes never left the page.



This student nurse volunteers her time to teach senior citizens about nutrition.

Other Health Occupations

"There are several health occupations that don't fit into any of the other groups," he began nervously. "But they are important, too. Take *pharmacists*, for example. If you are sick, your doctor may suggest you take a certain drug. The doctor writes an order, or prescription, for the drug. When you go to the drugstore, a pharmacist fills that prescription by giving you the exact drug the doctor ordered. But pharmacists do more than just putting pills in a bottle. They test each drug to see how strong and fresh it is. They must know what goes into each drug, how it is used, and what effect it has. And they give doctors advice on choosing and using drugs properly.

"Another important person is the *dietitian*. As you can tell from the word itself, dietitians are experts in diet or nutrition. They help plan meals for patients in hospitals and clinics. Since doctors sometimes prescribe certain foods for their patients, dietitians in a hospital may have to plan hundreds of individualized meals every day. Of course, not all dietitians work in hospitals. Many work in nursing homes, large companies, and schools like ours. And some work in neighborhood health centers, organizing programs to teach people about nutrition, meal planning, and the importance of good eating habits."

Luther turned the page without looking up. "But let's go back to the hospital for a moment," he continued. "We've heard about many of the people who work there: Nurses, doctors, laboratory workers, technicians, dietitians, and so on. It's clear that a hospital needs some people to coordinate the activities of all the others and make everything run smoothly. This is the job of *health administrators*. They supervise the operations of hospitals, nursing homes, and other health facilities. This job requires a great deal of business and organizational skill—the top administrator, after all, is responsible for keeping costs within a budget, hiring and training staff, and purchasing all the supplies. But health care is a very technical field. Moreover, it's one that's in the public eye and subject to lots of regulations. Administrators need to know about all the different aspects of providing and paying for health care in this country.

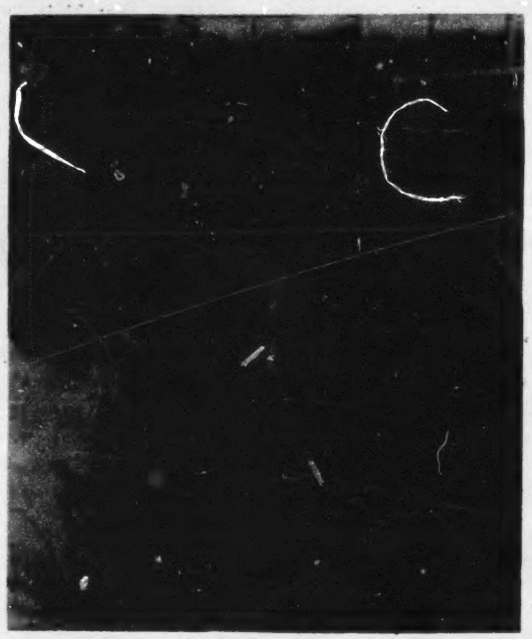
"There are many other important health occupations. Let me tell you about just a few of them. *Physician assistants*, sometimes called physician associates, perform many patient care tasks traditionally handled by doctors. They may do physical examinations, prescribe certain drugs, and advise patients about their health problems—all under the direct supervision of a physician. Their work frees doctors to devote their time to more complex diagnoses and treatments.

"*Health sciences librarians* do things that are done in any library. They order library materials and organize them as conveniently as possible for use by readers. But these librarians are different. They have a very specialized knowledge of books, journals, and reports in the field of medicine and health. Medical researchers, students, physicians and nurses, and many other health workers use their services.

"*Medical illustrators* are people with artistic talent as well as a strong science background. They create drawings, sculptures, and other art forms to illustrate medical and surgical procedures. Their work appears in books, films, exhibits, and on television, and is important for research and for teaching purposes.

"*Biomedical engineers* use their knowledge of chemistry, physics, engineering, and other fields to design medical equipment such as cardiac pacemakers, heart-lung machines, artificial kidneys, and electroencephalograph machines. *Biomedical equipment technicians* install and repair such equipment.

"There's one last occupation I want to mention. All along we've talked about health care for people. But if your dog or cat got sick, what kind of doctor would you visit? A *veterinarian*, of course. Many veterinarians treat only small animals and pets. Others specialize in farm animals. Still others inspect meat for public health agencies or do research. Whatever they do, though, their work is very important because animal diseases can spread to people—and because animals have value in themselves."



Experience working with animals can help you decide about a career as a veterinarian.

There was nothing more on the page to read, so Luther looked up. Everyone was staring at him. After a nervous silence, he remembered what came next. "Are there any questions?" he asked.

Nobody moved. Finally, the teacher ended the uncomfortable silence. "Thank you, Luther. That was very good. You may sit down now.

"All right, class, let's take a 5-minute break," continued Ms. Dombrowski. "Then we'll talk about these occupations some more."

What Makes a Good Health Worker?

After the break, Ms. Dombrowski led the class discussion. "We've just heard about dozens of different health careers," she began. "We were told what each worker does. Now let's see if we can figure out what kind of person is best suited for a job in this field. Does anyone have any ideas?"

Greg raised his hand. "It seems to me," he said, "that the health field is so broad there is room for people with all kinds of interests."

"That's a very important point, Greg," said Ms. Dombrowski. "Jobs in this field aren't all alike. There are careers in health for people who enjoy running machines and handling equipment; for people who like to work with numbers or scientific data; for people who like to work with others; for people who are interested in business; and for people who are interested in consumer and public interest issues."

Toni spoke up. "But people in many of the health occupations *do* have something in common. They're working in scientific surroundings: Collecting specimens of blood or tissue, for example; analyzing them; interpreting laboratory results; and making decisions on the basis of scientific data and research. It seems to me that you'd have to like science to observe very strict procedures, as a laboratory technician has to. Or to understand how the muscles in our body work, as a physical therapist must."

"Good point, Toni," said Ms. Dombrowski. "*Science and math* are important," she wrote on the chalkboard. "And the way you feel about your science courses in school may be a sign of whether or not you'd like a health career. Now what else?"

Luis had something to say. "The main thing about these occupations is liking people. That's what health care is really all about. If I'm a doctor, nurse, or whatever, I want to help my patients. That means more than examining them or giving them medicine. It also means putting them at ease and making them confident that I can help them. That confidence might make the difference in their recovery."

"Health workers should be *good at working with people,*" Ms. Dombrowski wrote. "We often call that "having a good bedside manner." That's good, Luis. Does anyone have more to say about that?"

Saul had a comment. "Getting along with people is more than just being nice. Look at speech pathologists, for example. Often their patients are retarded or emotionally disturbed. Progress often comes slowly or not at all. These workers must have a *positive outlook* and be able to inspire their patients to keep trying."

"You're right, Saul," said the teacher. "What else?"

The next hand in the air was Kevin's. "Liking people is important in some of the occupations," he said, "but not in all of them. Look at the medical record personnel, for example. They work with the patients' files. Or the laboratory workers, who test blood and tissue samples. Or the dental lab technicians, who make dentures. These workers never see the patients. So while many workers must have a good bedside manner, not all of them do."

"That's a good point, Kevin," said the teacher. "You don't have to be warm and outgoing for all of these jobs. And just because you can't stand the sight of blood doesn't mean you should rule out the health field either! Now what other qualities are important?"

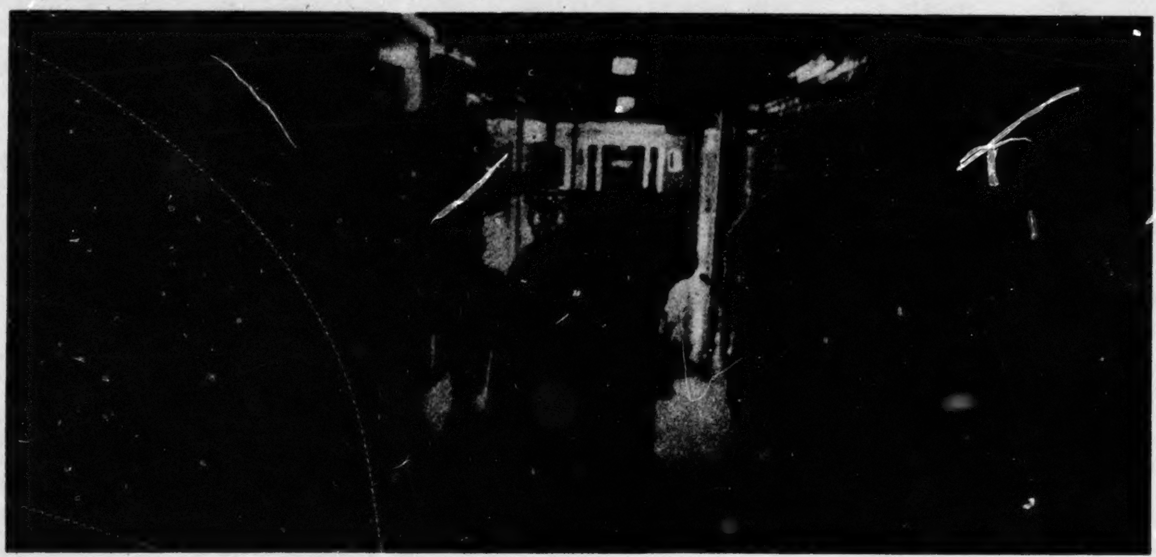
Jessica spoke up. "My cousin is a physician, and she talks about how much *motivation* the job takes. It's more than just patience or compassion; it's the ability to keep yourself going when you want to give up. My cousin had years of hard training that left her little time for other things. And even now, as a doctor, her work still cuts into her private life. She never would have made it if practicing medicine hadn't been so important to her." Jessica paused and thought about it. Then she added, "I guess nurses, emergency medical technicians, and many other health workers need the same kind of motivation. They have to get through difficult training, or work long hours, or do some work that is very unappealing. It helps if they consider their work important."

"I think that's true, Jessica," answered the teacher. "Feeling that their work is important may not be the only reason they do what they do, but it is a big part. Does anyone else have a suggestion?"

This time no hands appeared. "Well, let me make a couple," continued Ms. Dombrowski. "Health practitioners, dental workers, nurses, technicians, and others perform many detailed tasks with their hands. These workers must have *good manual dexterity,* which means the ability to work well with their hands. Not everyone has that quality.

"One other characteristic we should mention is the *ability to work under pressure.* Surgeons and emergency medical technicians, to name only two, often have to think and act quickly to save a patient. They can't let the pressure make them upset or careless.

"Does anyone have anything to add to the list? No? Well, I think we've covered the most important qualities of good health workers. And since you've all contributed



Emergencies require expert medical teamwork.

so much today, you deserve a rest. You may use the remainder of the period as you wish."

Training

No matter how much or how little time you're willing to put into training after high school, there may be a health career for you. You could start working as a hospital orderly without finishing high school; you'd receive your training on the job. Before becoming a physician, however, you'd have to train for 10 years or more after high school graduation. Those are the extremes. The training required for each of 32 health occupations is described in the Job Facts at the end of this chapter.

While formal training for a health career may be several years away, there are things you can do now to explore your interest in the field.

Science is very important in many of these occupations, and high school courses in biology, chemistry, physics, and mathematics provide the foundation you'll need for the science courses you'll take later on. Science fairs give you an opportunity to do projects on medicine and health.

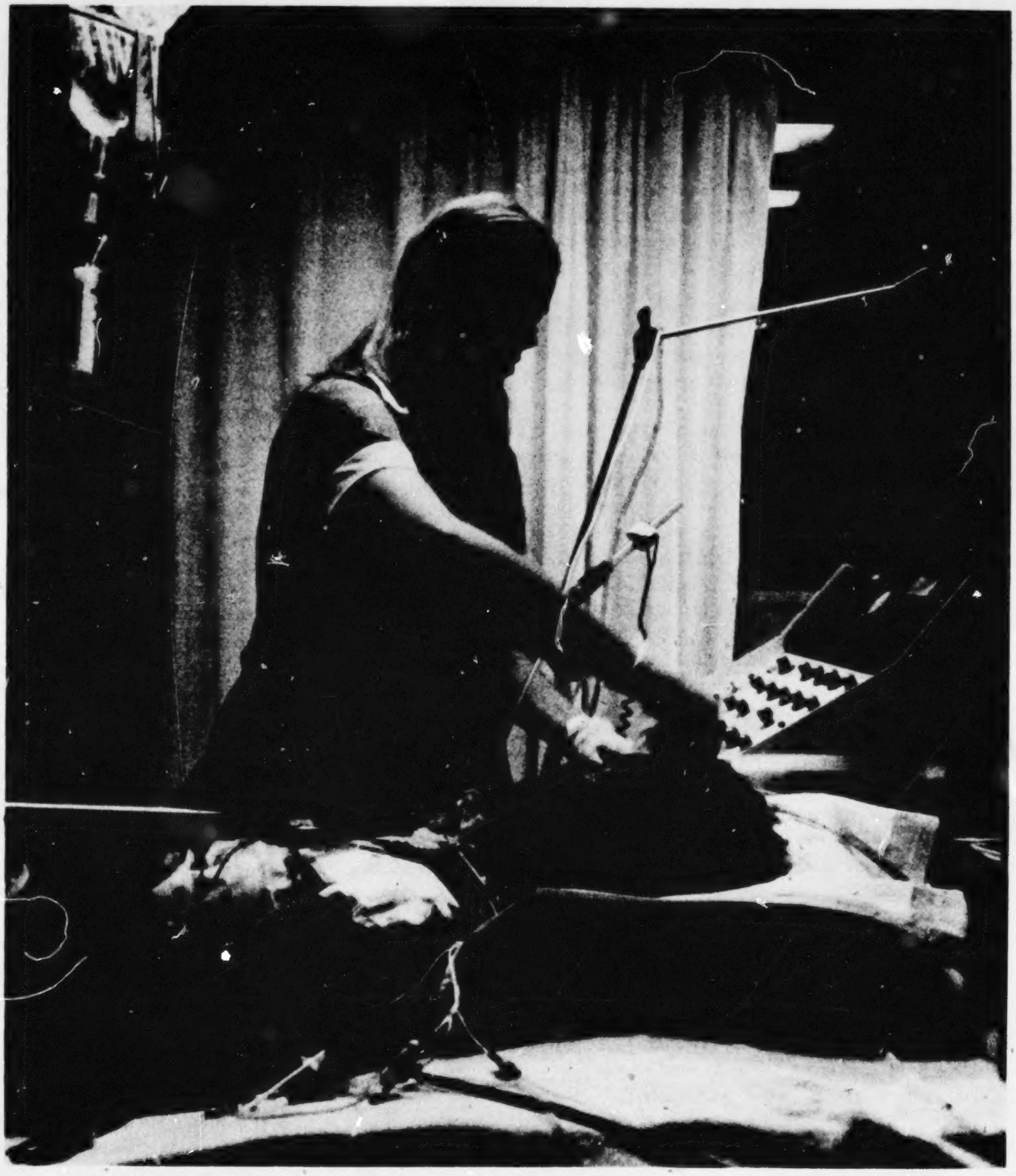
Join a Health Careers Club if there is one in your school. The school nurse or science teacher often is the sponsor, and club activities may feature films, speakers, hospital tours, and other ways of providing information about health careers.

Volunteer to work in a health setting. Many hospitals have "candy striper" programs open to both boys and girls. The American National Red Cross provides a variety of volunteer opportunities for youngsters. Positions for Red Cross youth volunteers are available in nursing homes, day care centers, day camps, bloodmobiles, and in programs for the handicapped. Organizations concerned with diseases or health problems such as heart disease or cancer use volunteers to assist in their public education efforts. Working in such volunteer positions will acquaint you with what goes on in a health care setting.

It takes years of rigorous training to become a physician.

Health Occupations

Registered Nurse



Kathy Wright works in an intensive care unit where she takes care of patients who are in serious condition following surgery.

Exploring Careers

Kathy Wright is a nurse at Leeds Memorial Hospital. She works in the surgical intensive care unit and takes care of patients who are in serious condition following surgery. Most patients go back to their rooms after an operation. But not all of them. Kathy's patients are in such critical condition that they are in a special unit where they can be watched every minute for changes that could mean life or death.

To provide the 24-hour care so necessary for these patients, the nurses at Leeds Memorial work day, evening, or night shifts of 8 hours each. The shifts rotate, so that Kathy and the other nurses in surgical intensive care take turns on each of the three shifts. This week Kathy is working from 7 a.m. to 3 p.m.

Kathy grew up in a household where medical research and hospital gossip were ordinary topics of dinner table conversation. Her father is a sales representative for a drug company, and her mother is a pediatrician. As a girl, she heard enough about the "real world" of medicine and nursing to dispel any romantic notions that she might have picked up from novels or from television. Listening to the adults talk about their work, Kathy soon came to realize that a professional health career means lots of work and responsibility.

To become a registered nurse (RN), Kathy completed a 5-year program at a university that led to a degree of B.S. in nursing. As a student nurse, she had a heavy dose of science courses, including chemistry, anatomy, microbiology, physiology, nutrition, and public health. Clinical practice—working in the university hospital under the close supervision of the nursing instructor—was another important part of her training.

After graduation, Kathy took the State board examination for licensure. In New York, as in all States, nurses must have a license. Just as a driver's license is proof that you know how to drive, the license required to practice nursing, medicine, dentistry, dental hygiene, or pharmacy, for example, shows that you know enough about your profession to provide safe and proper care.

Kathy chose the B.S. program in nursing because she wanted to keep her options open. She knew, from her talks with her mother, that advancement opportunities for nurses were best for those with a bachelor's degree. And she felt that, after several years of bedside nursing, she might want to move into another kind of job.

At this point, just a few years out of nursing school, she thinks she'll probably stay in hospital nursing. Still, from time to time Kathy thinks seriously about making a change. She wonders what it would be like to fulfill her youthful dream of nursing needy people abroad as a Peace Corps volunteer or a Medico nurse. She also thinks about returning to nursing school for the master's degree or Ph. D. she would need to teach or do research.

The bachelor's degree program that Kathy completed isn't the only way to become a nurse. Hospitals offer 3-year diploma programs and community and junior colleges offer 2-year associate degree programs. However, the bachelor's degree program in nursing generally opens more doors than either of the other two. It's important to look into all three ways of preparing for a nursing career.

Kathy gets off the elevator at the third floor, walks through the heavy double doors, and stops at the nurses' station. There she spends few minutes with Mr. Cochrane and Ms. Wall, the two nurses who have been on duty all night. It is customary for the nurses going off duty to give a general report to the incoming nurses. The group is joined by Ms. Rubel, the nurse who will be on the day shift with Kathy this week.

Ms. Wall begins talking to Kathy about the patients they "share." "Mr. Young needed medication for pain at 2 o'clock," she explains, "and Ms. Lance's temperature rose to 102 degrees around midnight, but went down shortly thereafter. Otherwise, their vital signs were normal. Ms. Vaughn slept very well. Ms. Lance is scheduled to be discharged from intensive care tomorrow."

"Fine," replies Kathy. "See you tomorrow."

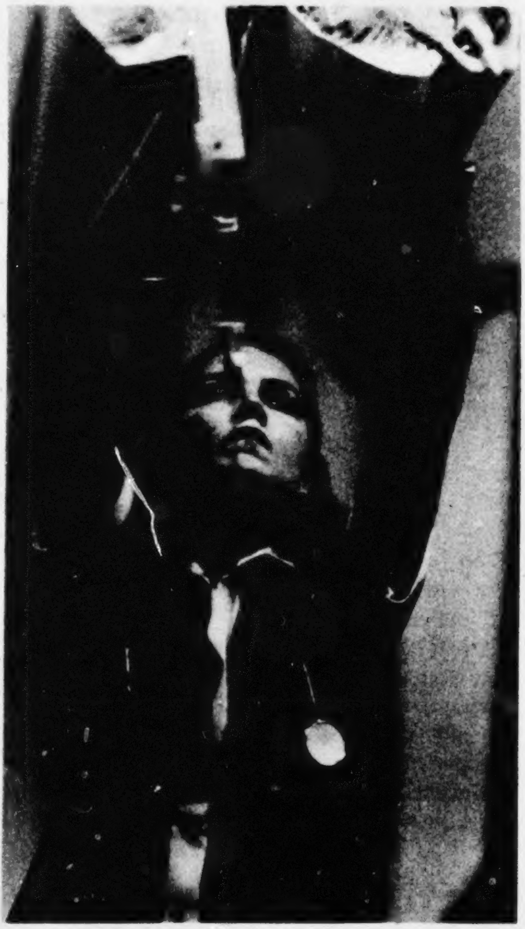
The nurses in the surgical intensive care unit at Leeds Memorial practice primary nursing. This means that each nurse is responsible on a 24-hour-a-day basis for the continuity, planning, and evaluation of nursing care for one to three patients. Currently, Kathy is responsible for Mr. Young, Ms. Lance, and Ms. Vaughn, while Ms. Rubel is responsible for two other patients. Nurses may act as associate nurses to patients during the absence of their primary nurse.

Kathy enters Mr. Young's room. Mr. Young is recovering from open heart surgery. She checks his vital signs: Blood pressure, pulse, temperature, and respiratory rate. All appear normal. Then she checks his skin color, and afterwards sees to it that he is comfortable. Kathy records the information on his chart for the doctors who will be by later on. She looks carefully at the tube inserted in his chest to drain blood and restore pressure around the lung after the open heart surgery. Everything is as it should be.

She also checks a tube inserted into the bladder to drain urine into a plastic bag. Kathy removes the bag, measures the amount drained, records this measurement, and replaces the bag. Kathy then examines the tubing inserted in a vein in Mr. Young's left arm to feed him while he is unable to eat. Kathy makes sure that the fluid is flowing smoothly into his blood stream, then looks to see if there is enough fluid in the bottle suspended from a floor stand next to the bed.

Kathy checks patients' vital signs regularly. Sometimes she must change dressings. When he was first admitted to the intensive care unit, Mr. Young was so weak he couldn't even breathe without help. He needed a respirator—a machine that breathed for him mechanically. Now that he's breathing on his own again—a good sign—Kathy checks often to make sure that Mr. Young is coughing and doing deep breathing to help clear his lungs.

Next, Kathy goes to see Ms. Lance, a young woman who underwent surgery a few days ago. Her doctors had ordered surgery because they suspected lung cancer, but when they tested the tissue they removed during the operation, they found that the tumor in her lung was not cancerous after all. Mr. Lance was overjoyed to learn his wife didn't have cancer; her children are too young to understand what all the fuss is about. Kathy bends over to listen to Ms. Lance's chest and lungs, checks for signs of infection, and changes her dressing. Everything is satisfactory. Since Ms. Lance is scheduled to be transferred to another part of the hospital tomorrow, Kathy discusses the details of her transfer with her and tells her what to expect.



"I observe every little thing about my patient's condition—and I have to understand what I see," emphasizes Kathy.

Kathy visits her third primary patient, Ms. Vaughn, who is recovering from surgery to repair a large aneurysm in her abdomen. An aneurysm is an expansion in one of the arteries caused by a weakening in the arterial wall. If the artery were to burst, the patient could die from internal bleeding. Fortunately, the surgeon repaired Ms. Vaughn's aneurysm in time. Ms. Vaughn is dozing but wakes up as she hears Kathy approaching her bed.

"Hello, Ms. Vaughn, how do you feel today?"

Ms. Vaughn doesn't reply, just points to her stomach to show that she is in great pain. Kathy gives her some medication and tells her to wait until the pain eases to do her coughing and deep breathing exercises. While Kathy is bathing Ms. Vaughn and making her comfortable in bed, Dr. Church enters the room. Kathy tells him about the severe pain. She also says that Ms. Vaughn's lungs sound clear and that she has bowel sounds, and suggests that Ms. Vaughn might be fed orally instead of intravenously. After further examination, Dr. Church agrees, orders the intravenous tube removed, and writes a prescription for a stronger medication for pain.

The remainder of the day goes smoothly. Just before lunch, Kathy receives a message to call Mrs. Young, the worried wife of her open heart patient. Kathy makes the phone call and reassures Mrs. Young. "Your husband is getting along nicely. He needed medication for pain last night, but he rested well and is making good progress. I looked in on him early this morning."

Mrs. Young thanks Kathy and adds, "I'll be around to see my husband this afternoon after work." In intensive care, only family members may visit and only for short periods of time.

At 3 o'clock, Kathy and Ms. Rubel meet the incoming nurses and give their report. "No emergencies, no unusual circumstances," comments Kathy.

"This is the first time in weeks that there have been no major problems in the unit," puts in Ms. Rubel. "I can't quite believe it."

Kathy can't believe it, either. She can, however, recall the many times when she has placed an emergency call to the resident or intern on duty. Emergencies always take a lot out of her, although it doesn't show. Kathy responds cooly to the tense, highly charged atmosphere of a crisis in the intensive care unit; she moves quickly and does what has to be done. She likes being part of an efficient health care team and she also likes being in a large hospital that has very sophisticated medical equipment and technology. In an emergency, Kathy handles her share of the work as smoothly as if she were a machine herself. Her years of training show. But afterwards, when the crisis is past, she unwinds.

Sometimes, despite the efforts of the doctors and nurses, a patient dies. That's hard on everyone. And Kathy, like everyone else in the unit, has had to find her own way of coming to grips with the sorrow of serious illness and the reality of death.

"I guess I will remain in medical-surgical nursing after all," muses Kathy as she walks through the parking lot toward her car. "After all," she continues, "although quiet days like this one are nice for a change, I really like the pressure of working in the intensive care unit. And I like the fact that the job is so exacting and precise. We really zero in on the patient's problem. I constantly observe every little thing about my patient's condition—and I have to understand what I see. If the patient's breathing or heart rhythm changes, it's up to me to know what that might mean and to make a decision about what to do next... Yes, hospital nursing seems right for me."

After a crisis, Kathy takes time to unwind.

Exploring

Nurses must be concerned about good health.

- Do you eat a well-balanced diet?
- Do you get enough sleep?
- Do you see the dentist regularly?
- Do you pay attention to warnings about alcohol, drug, or tobacco abuse?
- When you ask someone how he or she is feeling, are you really concerned or do you merely consider it a social custom?

Nurses must have an interest in science.

- Do you like science?
- Do you enjoy doing projects for a science class or science fair?
- Do you read articles about science in magazines or the newspaper?
- Do you like to visit museum exhibits on science and technology?
- Do you enjoy watching medical programs on television?

Nurses must be able to tolerate unpleasant sights and sounds.

- Does the sight of blood upset you?
- Do you look the other way when you pass the scene of an automobile accident?
- Does it bother you to change a diaper?
- Do you feel uneasy about going with an injured friend to the emergency room of a hospital?
- Do the sights and smells bother you when you visit people in a hospital or nursing home?
- Does the idea of dissecting a frog in a science class bother you?

Nurses must be very observant. They must recognize danger signals right away.

- Can you tell when your pet isn't feeling well?
- Can you tell when you have had too much sun?
- Can you tell when you should take a break from a baseball game or other athletic activity?

Health Occupations

- Can you tell when a car needs a tune-up?
- Do you notice minor changes in television or radio reception?
- Do you notice it when a movie reel is changed?
- Can you tell when something is missing from your room?

Nurses must carry out instructions precisely. There's no room for error when they give measured doses of medicine to patients.

- Are you good at following written instructions for assembling things?
- Can you remember road directions when someone gives them to you over the phone?
- Do you remember jokes and anecdotes?
- Can you memorize plays and coaches' instructions in football, basketball, and other sports?
- Can you remember a teacher's exact instructions for a homework assignment or a test?

Nurses should care about people. They deal with patients who often are at their worst during an illness or accident.

- Do you put up with friends even when they are grouchy?
- Do you mind hearing people complain?
- Do you visit relatives or neighbors when they are sick?
- Are you patient with your younger brothers or sisters when they are tired or irritable?

Nurses must stay calm during emergencies. A nurse might have to set up an oxygen tent, administer artificial respiration, or treat a patient having a heart attack.

- Could you keep calm and get help right away if your kitchen caught fire?
- Would you know what to do if an infant got hurt or stopped breathing while you were babysitting?
- Would you act sensibly if a pet were injured?
- Would you know what to do if a friend injured himself or herself on the playground?

As members of a health team, nurses must be good at giving and taking instructions and also must understand the limits of their authority.

- Can you give orders to your younger brothers and sisters?
- Do people do what you ask without getting angry?
- Do you recognize the need for laws, even those dealing with relatively minor offenses such as littering or jaywalking?
- Can you judge how far you can go when arguing with a teacher over a grade?

Nurses must have stamina. They spend a lot of time on their feet.

- Do you like to be active most of the time?
- Do you enjoy activities such as sports, hiking, backpacking, dancing, or gardening?

Nurses must keep accurate records of patients' medication, blood pressure, temperature, and so forth.

- Do you keep good records when you're a club treasurer or secretary?
- Do people ask you to keep score in bowling and other activities?
- Are you good at taking the minutes at meetings?
- Are you conscientious when you take notes in class?

Nurses must have manual dexterity to handle patients and medical equipment.

- Do you like working with your hands?
- Are you accustomed to using tools for work around the house?
- Are you good at setting up displays for class projects or school exhibits?

Nurses cannot afford to become emotionally involved with their patients.

- Can you remain calm when a friend or relative tells you about a serious problem?
- Does it upset you to visit someone who is very sick?
- Can you comfort a friend or family member during a time of sorrow?
- Can you argue a point calmly in a heated discussion?

Nurses keep up with the field by reading professional literature and attending lectures and conferences.

- Do you like to read for pleasure?
- Do you like to read popular science magazines?
- Do you show initiative in doing research on subjects of personal interest?
- When you are curious about something, do you go to an encyclopedia or library to learn more about it?
- Do you look up words you don't understand in the dictionary?
- Do you like to browse in the "new books" section of your library?

Suggested Activities

Volunteer to work in a hospital, nursing home, or clinic in your community. Volunteers typically provide entertainment; deliver mail and flowers to patients; write letters for patients and read to them; visit patients to cheer them up; run errands; direct visitors; conduct play activities for children; and provide babysitting services for visitors. They also do clerical jobs such as typing, filing, and stuffing envelopes.

Get in touch with the American National Red Cross about opportunities to work as a youth volunteer. Red Cross youth volunteers serve as tutors for younger children and as aides in hospitals, day care centers, and nursing homes; recruit blood donors; help with programs to combat drug abuse among young people; and play and study with homebound and handicapped children.

Contact the Boys' Club or Girls' Club in your community. Clubs offer a wide variety of programs including volunteer service at hospitals and work with retarded and handicapped children.

Babysit for a younger brother or sister. Take care of a neighbor's child. How does it feel to have someone depend on you?

Care for neighbors' pets when the owners go away. You'll have the experience of being responsible for an animal's basic needs.

Ask your teacher to arrange a class tour of a hospital or nursing home.

Invite one or more nurses to speak to your class about their jobs. Ask the speakers to discuss their duties, their training, and the rewards and frustrations of nursing. If possible, arrange for a panel discussion by nurses in several different specialties: A school nurse, a psychiatric nurse, a public health nurse, and an emergency room nurse, for example.

Contact your local chapter of the American National Red Cross to arrange a demonstration, talk, or movie on first aid for your science or health class.

Take a course in first aid from a certified instructor. First-aid courses teach you how to prevent accidents; how to protect accident victims; how to give emergency care for severe bleeding, stoppage of breathing, or oral poisoning; and how to take care of minor injuries.

Ask the school nurse to teach you how to take someone's pulse, blood pressure, and temperature.

Join a Science Club or a Health Careers Club if there is one in your school.

Use nursing as a topic for class assignments. Read a biography of Florence Nightingale for a book report in an English class. Prepare a report on the history of nursing for a social studies class. Explore an issue in public health, such as pollution, smoking, or drug abuse, for a science or health class. Choose a topic in biology or medicine for a science fair project. Report on metric measurements in the health field for a mathematics class.

Use first aid as a topic for a report in a science or health class.

- Describe what should be done for severe bleeding. When should a tourniquet be used?
- Explain the dangers of moving a seriously injured person. Tell how you would decide what method to use. Demonstrate a chair carry and a two-person carry. Show how to improvise and use a stretcher.
- Demonstrate how to apply an adhesive bandage, a large gauze compress held in place by tape, a dressing on the eye with a cravat, and a roller bandage on the ankle and foot, wrist and hand, forearm, and finger.
- Explain how to recognize and treat unconsciousness, shock, convulsions, poisoning by mouth, burns, and injuries to joints.
- Explain the objectives of artificial respiration. Demonstrate mouth-to-mouth and mouth-to-nose rescue breathing as well as the chest-pressure arm-lift and back-pressure arm-lift.
- Explain cardiopulmonary resuscitation (CPR).

Take a course in lifesaving from a certified organization. The Red Cross and the Boy Scouts of America both offer courses in Junior Lifesaving.

Join an Explorer Post if there is one in your area. Exploring, open to young men and women aged 14 through 20, offers programs in nursing, medicine and health careers, physical or natural science, child care, and emergency first aid. To find out about Explorer posts in your community, call "Boy Scouts of America" listed in your phone book, and ask for the "Exploring Division."

If you are a Boy Scout, earn a merit badge in Public Health, First Aid, General Science, Lifesaving, or Emergency Preparedness.

If you are a Girl Scout, see if your local troop has the From Dreams to Reality program for exploring careers. Troops also sponsor service aide and community action projects in the health field, and offer proficiency badges in First Aid, Nursing, Lifesaving, Public Health, and Science.

Write for career information to the National League for Nursing, Career Information Services, 10 Columbus Circle, New York, New York 10019, and to the Veterans Administration, Department of Medicine and Surgery, 810 Vermont Avenue, N.W., Washington, D.C. 20420.

Related Occupations

Registered nurses work in many different settings. Some of these are listed below. Choose the statement that applies to each nurse's specialty.

1. **School nurse**
   a. Finds cures for contagious diseases peculiar to children
   b. Gives immunizations and maintains students' health records
   c. Teaches in a school of nursing

2. **Public health nurse**
   a. Prescribes medication for acne
   b. Writes advertisements for drug companies
   c. Teaches neighborhood residents about nutrition, hygiene, and other aspects of good health

3. **Nurse-midwife**
   a. Works under the supervision of a cardiologist
   b. Delivers babies and teaches new mothers sound health practices
   c. Trains ambulance personnel

4. **Nurse anesthetist**
   a. Administers drugs so that patients don't feel pain during operations or childbirth
   b. Examines ears, nose, and throat for signs of disease
   c. Develops vaccines for protection against disease

5. **Office nurse**
   a. Prepares a physician's patients for examination and provides whatever help the physician needs
   b. Gives first aid to office employees
   c. Tests for the presence of bacteria in a community's water supply

6. **Private duty nurse**
   a. Plans nutritious meals for hospital patients
   b. Provides nursing care, for a fee, in the patient's home or in a hospital or nursing home
   c. Operates an artificial kidney machine

7. **Occupational health or industrial nurse**
   a. Teaches blind patients new job skills
   b. Directs research to protect industrial workers from radiation hazards
   c. Treats employees and customers who become ill or have an accident in a department store, factory, or other business firm

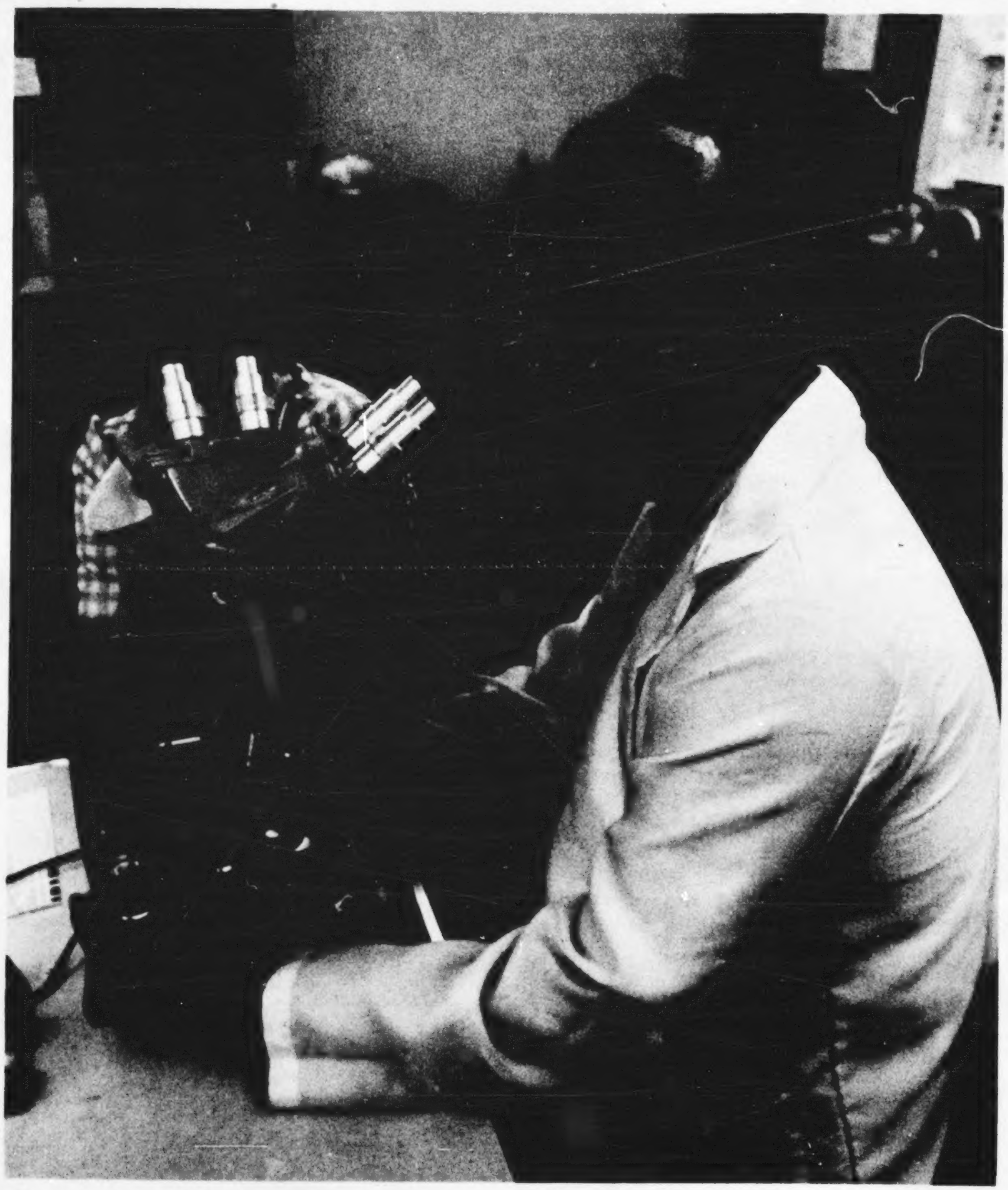
8. **Psychiatric nurse**
   a. Studies effects of high-altitude flying on airplane pilots
   b. Cares for patients who are mentally ill
   c. Performs brain surgery

9. **Rehabilitation nurse**
   a. Cares for patients who have chronic or disabling conditions, conditions that can't be cured quickly—if ever
   b. Converts old buildings into nursing homes
   c. Estimates future hospital costs for insurance companies

10. **Consultant nurse**
   a. Organizes volunteer services in a hospital or nursing home
   b. Sells drugs to hospitals
   c. Advises hospitals and nursing homes on ways to improve their nursing care

See answers at end of chapter.

Medical Technologist



Roberto Torres' interest in science led to a career as a medical technologist.

Health Occupations

I'm Roberto Torres, a medical technologist at St. John's Hospital. In the medical laboratory where I work, we do tests to find out exactly what's wrong with people who are sick. Doctors need to know what the problem is in order to take care of it.

Our medical laboratory is divided into four departments: Clinical chemistry, bacteriology, hematology, and the blood bank. I'm in bacteriology, or microbiology—have been ever since I started work here at St. John's. My training covered the other areas, though, and chances are that sooner or later I'll be in hematology or one of the other departments of the lab.

I became interested in chemistry during my freshman year in college [illegible] did so well in it that Professor Reiber encouraged m[illegible]nsider a career in science. Following his suggestion[illegible]ited the Kroner Laboratories and talked to so[illegible]he people who worked there. One thing led to a[illegible] and I decided to become a medical technologist. My college offered a B.S. in medical technology and that's the degree I have.

During my senior year in college, I worked at City Hospital, rotating among the various departments of the medical laboratory. Clinical rotations give you a chance to put your classroom knowledge to work in a real life situation. They're part of the training for just about every health occupation, I guess. After I graduated, I took a special exam and when I passed I was officially "registered" as a medical technologist. Exams, certification, registration—it's a way of protecting the public and you find it in most health careers. But from my point of view, registration helps in getting a job and, sometimes, a higher salary. All the medical technologists at St. John's are registered.

A pathologist is in charge of the medical laboratory here. He's a physician, of course, one who has spent years studying the ways in which disease shows up in the tissues and fluids of our bodies. More people work in a medical laboratory than you might think. St. John's isn't a huge hospital, yet there are about 70 people working in the medical laboratory here. In addition to medical technologists like myself, there are technicians and assistants who take care of the more routine kinds of lab work. They didn't have to take as much training as I did, just 1 or 2 years in most cases.

Yesterday was a fairly typical day in the bacteriology department. We had the usual sorts of things to test: Samples of urine, spinal fluid, throat cultures, material from wounds, and blood. Physicians have samples sent to bacteriology when they suspect an infection or a disease. I'll give you an example. One of the patients we're trying to help is a woman who's worried and upset because she's gradually losing the strength in her legs, and the doctors don't know why. They've tried lots of different tests, and yesterday she had an extremely painful one: The doctor used a long hypodermic needle to remove some fluid from her spinal canal. Now we're testing that fluid to see what it can "tell" us. If some of the cells are abnormal, we'll know she has a nerve disease, which could explain her weakness.

This morning, a throat culture came in to the lab. The doctor who sent it suspects an infection and wants to find out which antibiotic to prescribe for the patient's sore throat. An antibiotic is a chemical substance that destroys bacteria. But since there are so many kinds of bacteria that make people sick, and so many different antibiotics to combat them, the first step is to find out exactly what we're dealing with. That's where the lab comes in.

The culture arrived on a swab in a sterile tube. I placed some of it in a special dish containing nutrients that make bacteria grow, then put the dish in an incubator—a warm place where the bacteria probably will grow overnight. Tomorrow morning I'll try to identify the bacteria, using chemicals. I'll also make slides and examine them under a microscope. Then I'll experiment to find out which antibiotic works against the strain of bacteria I have identified.

When I finish all the tests the doctor has asked for, I'll record the results and notify her. We come up with

A technologist must do accurate testing. "A patient's life could depend on it," says Roberto.

Roberto confers with a coworker. "The hospital staff is a team," notes Roberto, "so you have to depend on each other."

results quickly, I'd say. I usually have something to report in 48 to 72 hours. Once in a while, when test results don't make sense to the patient's physician, we run tests on another specimen just to make sure. You can't be too careful in a medical lab. But mistakes sometimes happen, and our test results can be wrong. That's why the human factor—judgment—is so important.

Jessica just started working in the lab last week. She's in the clinical chemistry department and operates machinery that tests blood for sugar, salt, fat, and protein content, and for disease. She's testing for sugar content right now. She begins by placing tubes of blood in a machine that spins very fast, so fast that the blood cells fall to the bottom of each tube. The material that remains on top is the serum. It looks like water and contains the sugar; chemicals in the machine make the sugar turn blue. Knowing whether or not a patient has the proper amount of sugar in his blood helps a physician treat him properly. Many of the machines Jessica works with are linked up with a computer, enabling her to run literally thousands of different tests in a very short period of time. Computers have made a big difference in medicine, and you really appreciate that in a lab.

I ate lunch with Fritz today, as usual. Fritz has worked at St. John's nearly as long as I have, and we're good friends. He's in hematology, where they specialize in testing blood. Fritz does blood counts much of the time; he's concerned with the number of red cells and white cells in the blood. I guess you know already that red cells carry oxygen and white cells fight infection. Fritz operates machinery that places drops of a blood sample on a slide, stains the sample with colored dyes to help identify the cells, and smears the blood across the slide. Then he sets the slide under a microscope and looks closely at the white blood cells. Red cells all look alike, but white cells don't. Fritz can differentiate among white cells, and his count of the various kinds of white cells in the patient's blood will give the physician a good idea of whether or not something is wrong.

Another friend of mine, Wanda, works in the blood bank. Wanda and I talk about our jobs a lot. One of the things we both like is that our jobs rarely intrude on our personal time. In short, we leave our work in the laboratory. Wanda and the other technologists in the lab draw blood from blood donors—healthy people who donate blood to the blood bank. This blood is refrigerated in plastic bags and usually stays healthy for 21 days. The laboratory receives patients' blood samples in tubes from other parts of the hospital or from private physicians. These patients often are scheduled to undergo surgery, and doctors need to have blood available for transfusions. Medical technologists in the blood bank must find donors' blood that is compatible with patients' blood samples sent to the lab.

Technologists perform chemical tests to determine the type of blood in the sample. Blood may be typed A, B, AB, or O. In addition, technologists must determine the Rh factor as Rh positive or Rh negative, referring to the presence or absence of certain inherited substances in the red blood cells. The technologists then find stored blood that matches the blood in the patient's sample, and retest it as a precautionary measure. To be usable, the stored blood must be exactly like the patient's blood. In the event that no compatible blood is in storage, the technologists would contact the Red Cross to obtain the appropriate type.

Accuracy is essential in the blood bank and the workers here are under great pressure to avoid mistakes. A mistake by a laboratory technologist can kill a patient. Take the case of someone in an automobile accident who needs emergency surgery. If the lab made an error in testing and the patient received the wrong blood during the operation, he or she could die. That's an awesome responsibility.

Last fall I was invited to supervise some medical technology students who were doing their senior year clinical rotation in the biochemistry department here. I was surprised to discover how much I enjoyed teaching! I'm thinking of going back to school for a master's or Ph. D. so that I can teach full time in a college or university program in medical technology. But that's a pretty big step, after all.

Although my job can be routine at times, I know enough science to understand what the tests really mean. Once I've run some tests, I usually have an idea of what's going on inside the body of a patient with this or that disease. That makes the work interesting, and I don't know whether I want to give it up to teach.

And another thing. If I went into teaching, I might miss the day-to-day contact with the hospital staff. I like being part of the team effort here to help sick people. Well, I guess I'll have to give it a lot more thought . . . .

Exploring

Medical technologists must have a strong interest in science.

- Do you like science? Are you interested in biology and chemistry?
- Do you like to do laboratory experiments in class or on your own?
- Do you pursue science projects independently?
- Have you ever entered a science fair?
- Are you curious about the unknown?
- Do you like to study things under a microscope?
- Do you like to experiment with chemistry sets?

Medical technologists must be very accurate. Sometimes they are under pressure to work quickly, but they must be precise just the same. A patient's life might depend on it.

- Do you check your homework for errors?
- Do you check your answers on a test before handing it in?
- Do you do things in a methodical way?

Medical technologists must have an eye for detail. They have to detect even the slightest variations in the samples they examine.

- Do you enjoy identifying trees, leaves, or birds?
- Do you collect and identify sea shells?
- Can you tell that something is missing from your room?
- Can you find a place on a road map quickly?
- Do you like to do word-finds and other games where you must find hidden objects in pictures?

Medical technologists need manual dexterity to handle medical equipment such as test tubes, slides, and microscopes.

- Do you like working with your hands?
- Do you enjoy building models, setting up electric trains, framing pictures, making ceramics, making electronic equipment from a kit, or working with photographic equipment?
- Are you accustomed to using tools for work around the house?
- Are you good at setting up displays for class projects or school exhibits?

Medical technologists don't spend much time with patients. They work with laboratory equipment instead.

- Do you like building things?
- Do you like collecting things?
- Do you enjoy class assignments that involve working with scientific equipment?

Medical technologists must be able to follow strict laboratory procedures.

- Do you pay attention to instructions when you're taking a test or doing a homework assignment?
- Are you good at following a recipe?
- Do you use patterns for sewing, knitting, or needlework?
- Do you follow the instructions carefully when you mix chemicals from your chemistry set, build a model, or assemble electronic equipment from a kit?

Medical technologists are members of a health care team. They must work well with others.

- Do you enjoy working with other people on class projects? Do you accept your share of the responsibility?
- Do you like working with others on school clubs or committees?
- Do you like team sports?
- Do you like to organize group activities such as parties, sports events, picnics, and dances?

Medical technologists must be concerned about good health.

- Do you eat a well-balanced diet?
- Do you see the dentist regularly?
- Do you get enough sleep?
- Do you pay attention to warnings about alcohol, drug, or tobacco abuse?
- When you ask someone how he or she is feeling, are you really concerned or do you consider it a social custom?

Medical technologists keep up with the field by reading professional literature and attending lectures and conferences.

- Do you like to read for pleasure?
- Do you like to read popular science magazines? Do you read articles on medicine and health in magazines and newspapers?
- Do you show initiative in doing research on subjects of personal interest?
- When you are curious about something, do you go to an encyclopedia or library to learn more about it?
- Do you look up words you don't understand in a dictionary?
- Do you like to browse in the "new books" section of your library?

Suggested Activities

Stimulate your interest in science by reading and doing experiments or projects.

- Work with a chemistry set, the kind available in hobby shops or department stores.
- Prepare slides and examine them under a microscope.
- Do a project in the life sciences for a science fair.
- Read popular science magazines.

Join a Science Club or a Health Careers Club if there is one in your school.

Contact your local chapter of the American National Red Cross to arrange a talk for your science or health class on the Red Cross blood program.

Ask your teacher to arrange a class tour of a medical laboratory.

Invite a medical technologist to speak to your class about his or her job. Ask the speaker to bring and explain some of the equipment used in a medical laboratory. Ask him or her to talk about job duties, training, and the rewards and frustrations of this kind of work.

Volunteer to work in the medical laboratory of a hospital, clinic, or nursing home. You might be able to run errands, wash equipment, or do clerical work.

Get in touch with the American National Red Cross about opportunities to work as a youth volunteer. Red Cross youth volunteers help recruit blood donors, serve as tutors for younger children, and as aides in hospitals, day care centers, and nursing homes.

Join an Explorer Post if there is one in your area. Exploring, open to young men and women aged 14 through 20, offers programs in medicine and health careers, physical or natural science, and emergency first aid. To find out about Explorer posts in your community, call "Boy Scouts of America" listed in your phone book, and ask for the "Exploring Division."

If you are a Girl Scout, earn a proficiency badge in Science, Public Health, or First Aid.

If you are a Boy Scout, earn a merit badge in General Science, Public Health, First Aid, Lifesaving, or Emergency Preparedness.

Take a course in first aid from a certified instructor.

Prepare a report for a science or health class on the diseases spread by rats, flies, worms, and ticks. Explain how people catch yellow fever, rabies, hookworm, typhoid fever, and tetanus.

Write for career information to American Medical Technologists, 710 Higgins Road, Park Ridge, Illinois 60068; American Society for Medical Technology, 5555 West Loop South, Bellaire, Texas 77401; American Society of Clinical Pathologists, Board of Registry, P.O. Box 4872, Chicago, Illinois 60680; and International Society for Clinical Laboratory Technology, 818 Olive Street, Suite 918, St. Louis, Missouri 63101.

Related Occupations

Medical technologists aren't the only people whose work in laboratories helps us to understand and treat disease. Ten other occupations are listed below. See if you can choose the correct job duty for each.

1. **Medical laboratory technician**
   - a. prepares patients' medical records
   - b. does routine laboratory tests for use in diagnosing or treating disease
   - c. mixes drugs under the direction of pharmacist
2. **Veterinary laboratory technician**
   - a. investigates animal diseases that can be caught by humans
   - b. inspects livestock in slaughterhouses
   - c. prepares vaccines that protect animals against disease
3. **Medical laboratory assistant**
   - a. stores and labels plasma and does other routine work in a blood bank
   - b. performs autopsies to determine the cause of death
   - c. conducts research to protect medical laboratory personnel against infection
4. **Pathologist**
   - a. runs a machine that does computerized brain scans
   - b. studies disease and its effect on the cells and tissues of our bodies
   - c. studies insects and their relation to plant life
5. **Chemist**
   - a. conducts research and experiments on gaseous, liquid, and solid materials
   - b. develops computer programs for drug manufacturers
   - c. designs biomedical laboratory equipment
6. **Cytotechnologist**
   - a. measures radioactivity in the cells of workers at nuclear reactors
   - b. studies bee culture and breeding
   - c. stains, mounts, and examines human body cells under a microscope
7. **Zoologist**
   - a. designs natural habitats for animals in zoos
   - b. studies origin, classification, habits, and diseases of animals
   - c. plans breeding studies to improve varieties of plants
8. **Histologic technician**
   - a. prepares sections of body tissues for examination by a pathologist
   - b. removes deposits and stains from teeth
   - c. operates ultrasound diagnostic equipment to produce pictures of internal organs
9. **Biochemist**
   - a. specializes in taking X-rays of specific parts of the body
   - b. measures impulse frequencies from the brain
   - c. studies chemical processes of living organisms in order to understand allergies, vitamin deficiency, hormonal imbalance, and other medical problems
10. **Geneticist**
    - a. handles legal problems in the field of inheritance taxes
    - b. conducts research on inherited traits such as hair and eye color and resistance to disease
    - c. tests blood samples using an automatic blood analyzer

See answers at end of chapter.

Physical Therapist

"Physical therapy is teaching patients how to help themselves," says Julie.

Health Occupations

Doctors Hospital, with 500 beds, always seems busy, and the physical therapy department isn't immune from that hustle. Two patients were already in the waiting area when Julie arrived at 7:45. A middle-aged man was sitting quietly in a wheelchair and a fellow in his 20's was lying on a transport bed. Both were inpatients—patients staying at the hospital. Julie greeted them, said hello to the receptionist, and then went on to the treatment rooms. There, two other physical therapists were preparing for the patients in the waiting room.

"Hi, Tom."

Tom Harmon was adjusting the water temperature in the Hubbard tank for his burn patient, Joe Power. Joe had been badly burned when the gasoline can he had been holding had exploded. He had second and third degree burns on his legs and arms and first degree burns on his face. Joe had been using gasoline to restart the fire in a pile of smoldering weeds. He prefers not to talk about the accident.

The water in the Hubbard tank will make bending the burned limbs easier and soften the dead skin tissue so Tom can remove it. This was one of the treatments that physical therapists like Tom and Julie liked the least, because the patient usually is in so much pain. Without the treatment, though, the burned skin would tighten up and leave the patient with much less mobility after the burn healed. It gives the therapists some comfort to know the pain is worthwhile in the long run.

"Good morning, Nicki."

Nicki Bathista was the other therapist. She was setting up the parallel bars. Her first patient had lost his leg in a construction accident. He had just been fitted with an artificial leg and Nicki would help him learn to walk normally with it.

Julie was bound for room 514 and a patient she had seen several times in the last 2 days. After collecting the patient's records, she headed for the elevators.

"I hope the swelling in his leg is down today," Julie thought. While she waited for the elevator and on the ride up to the fifth floor, she reviewed Mark's case. Mark is an 18-year-old gas station attendant. Two nights ago, he was riding his motorcycle on the freeway when a drunken driver swerved into his lane, knocking him to the pavement. Mark's helmet prevented any head injuries and probably saved his life, but he didn't escape unharmed. He wound up with a cracked forearm, a fractured hip, and a badly fractured femur or thigh bone that was giving him a lot of trouble. The fracture had severed some important arteries in his leg. The surgeons had reconnected the arteries, but the swelling in his leg was considerable and the doctors weren't sure there was enough blood circulation. Inadequate circulation could mean that Mark would lose his leg. Before the fractured leg could be set and Mark wrapped in a cast to immobilize his hip and leg, the swelling had to be reduced and the surgeons had to be sure there was adequate circulation.

The elevator doors opened onto the fifth floor and Julie strode down to 514.

"Good morning, Mark," she said as she looked over his chart. "How is the leg?"

"It hurts a lot."

"Well, when the swelling goes down, that will improve," Julie told him. The exercises she was about to help him with were supposed to reduce the swelling.

Mark looked unhappy. Although she didn't ask, Julie guessed that no one had visited him yet. Yesterday, Mark had told her that no one had come to see him. He was sure no one cared.

"Come on, Mark. Let's get to it! We'll have you up and out in no time!" Julie tried to encourage Mark and boost his morale. Realizing that she was concerned about him would, she hoped, ease his loneliness.

The exercises Mark performed were prescribed by a physician. After she had performed the emergency surgery on Mark's injured leg, the surgeon had written an "order" or prescription for Mark to receive physical therapy. Ordinarily, Julie would know exactly what to do after reading the order, but Mark's injuries were extensive and Julie wanted no chance for an error in his treatment. So, before she even visited with Mark, she consulted with the physician and discussed her goals for Mark's treatment.

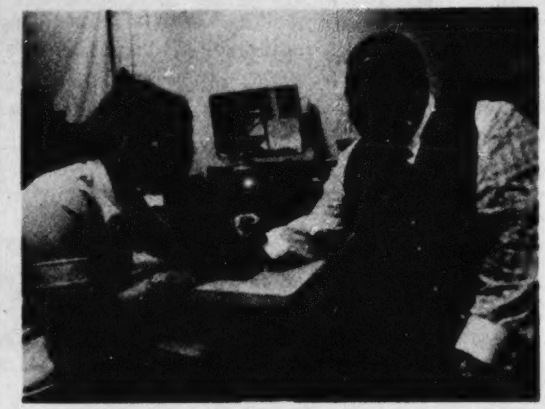
The surgeon wanted her to exercise Mark's injured leg to promote improved circulation and prevent the muscles from withering away. Mark would be hospitalized a long time and where muscle tone is concerned, "If you don't use it, you lose it."

"We'll start out slowly, Mark. Just wiggle the toes on this injured leg." The exertion caused Mark some pain, but Julie explained how necessary the exercises were to the leg's recovery, so Mark didn't complain.

"O.K. Now tighten your thigh muscles to move your knee caps."

"He's doing pretty well," Julie thought. "In spite of his depression, he's trying hard at his therapy, so, as his physical condition improves, his spirits probably will improve too."

Julie's next patient was a special one. Sarah was a 5-year-old with cerebral palsy. Cerebral palsy affects the brain so that the patient has great difficulty controlling the muscles used for moving about. Physical coordination is greatly hampered, but with the proper therapy, improvement usually is possible. Julie's evaluation of Sarah at this time indicated the child had the physical coordination of an 8-month-old baby. Sarah was still



"The best part of my job is sharing the joy of patients who are making progress."

improving, though, so she may eventually learn to walk. The damage from cerebral palsy is difficult to identify. The therapist doesn't know the limits of a patient's abilities until he or she reaches them. When the patient stops improving, then the therapist knows the extent of the damage.

"Good morning, Sarah. Let's practice our rolling."

She and Sarah then rolled around on the floor mats of the treatment room. First, Julie rolled over—demonstrating the move with considerable enthusiasm. Then, with Julie's help, Sarah took her turn.

"She almost has the knack of rolling over," thought Julie. "Maybe next week I can start teaching her to crawl."

After crawling, Julie would try to teach Sarah to sit, then kneel, then stand, and, she hoped, walk.

As Sarah and her mother were leaving, Toby Pappas walked in. Toby, a high school junior, is a volunteer aide here in the P.T. department. Two months ago, when he first started working here, he transported patients to and from their rooms. Since then, he has gradually been learning how to assist with the treatments. His friendly, easygoing manner has won him quick acceptance from the patients. Toby obviously enjoys helping Julie, and she takes extra time to explain the equipment and procedures to him. Toby is a bright student and Julie hopes to interest him in physical therapy as a career.

"Hi, Toby. Want to help with a stroke patient?"

"Sure, Julie, but I haven't had experience with a stroke victim."

Julie explained that a stroke occurs when the flow of blood is cut off to some part of the brain. "Without the lifegiving oxygen supplied by fresh blood from the lungs, brain cells will be damaged after only a few minutes. If the interruption is complete enough, the brain cells will die in less than 10 minutes. The effects of the stroke depend on the area of the brain involved.

"The first job of the therapist, Toby, is to evaluate the patient. Every stroke patient is different. Some patients can't use their legs. With others, only the arms are affected. Many can't talk. So you have to isolate the muscle groups that are affected and then work to reeducate those muscles and raise the patient's level of functioning to his or her full potential.

"Mr. Davis' stroke left him with his right side paralyzed. At first, he wasn't even aware of the position of his right arm or leg. We first moved the arms and legs for him to maintain the capability for motion in his joints. Then we helped him roll from side to side on his bed. After he could do that by himself, we taught him to sit up in bed. Now we are going to work on teaching him to kneel, to stand, and to walk.

"Of course, all that will take time. And, if the stroke completely killed the brain cells that control those functions, Mr. Davis won't make any more progress."

"What can I do to help today?" asked Toby.

"I'll be teaching Mr. Davis how to move his body from a sitting position to a kneeling one. He won't be able to master that today, though, and that may discourage him. You can help boost his spirits by encouraging him and giving him praise."

"I'll do my best."

"Oh, Toby. One more thing. Mr. Davis' speech was affected by his stroke. A speech therapist is working with him, but he still can't talk. Don't worry, though. He understands every word that is said."

Toby went to the waiting room and brought Mr. Davis to the treatment area while Julie reviewed his treatment record.

After Mr. Davis had completed his routine, Toby took him in his wheelchair back to his room.

It was lunchtime for Julie, and she had been looking forward to it. A quick lunch at the El Sombrero, a restaurant across the street. "Come on, Toby, I can't wait for those tacos and tamales."

At night the El Sombrero was a posh dining spot with mariachi singers and substantial prices. At noon, however, it offered a quick and reasonable lunch.

After they were seated, Toby asked Julie how she first became interested in physical therapy.

"Doing volunteer work, just like you," replied Julie. "I volunteered to help at St. John's Hospital and was assigned to the P.T. department. I liked the work so much that I majored in physical therapy when I went to college."

"What was the course work like in college?"

"A lot of science. I had courses in chemistry, biology, physics, neurology, physiology, and anatomy. Psychology was required, too, and that proved to be very helpful. A course in psychology of the handicapped really opened my eyes to the way handicapped persons view the world and helped me understand some of their hopes and fears."

Julie went on to explain the "rotating" assignments she had had during the last half of her senior year in college. "That was a valuable experience. It gave me a taste of the day-to-day work in most of the specialty areas as well as the general practice of physical therapy. I spent 1 week in Children's Hospital, 6 weeks in the Wheaton Rehabilitation Center, 2 weeks at Pleasant View Nursing Home, and 5 weeks here at Doctors Hospital.

"It was during my rotation that I discovered I really preferred working with a variety of patient problems—the sort of variety you're most likely to find in a hospital like this. After I passed the State board examination and got my license to practice physical therapy, I applied here at Doctors.

"Since then," she said with a smile, "I've had to take up swimming just to keep my weight down and still eat lunches here at El Sombrero."

Exploring

Physical therapists must be concerned about good health.

- Do you eat a well-balanced diet?
- Do you get enough sleep?
- Do you see the dentist regularly?
- Do you pay attention to warnings about alcohol, drugs, or tobacco abuse?
- When you ask someone how he or she is feeling, are you really concerned or do you consider it a social custom?

Physical therapists must be interested in science.

- Do you like science courses?
- Do you enjoy doing projects for a science class or a science fair?
- Do you read articles about science in magazines or the newspaper?
- Do you like to visit museum exhibits of science and technology?

Physical therapists must teach patients special exercises.

- Do you like to help your friends with homework?
- Are you good at teaching children sports or directing them in arts and crafts?
- Are you good at teaching a child to swim or ride a bicycle?
- Have you ever tutored elementary school children?
- Do you help your younger brothers or sisters with reading, writing, or arithmetic?

Physical therapists don't see the results of their work right away. They must remain supportive and hopeful even when progress is slow.

- Do you appreciate small gains or progress?
- Do you have the patience to grow a garden?
- Can you stick with a diet or exercise program?
- Do you appreciate the eventual benefit of having braces on your teeth right now?
- Do you have the patience to practice a musical instrument faithfully?

Physical therapists must believe that one can succeed if he or she really tries.

- Are you an optimistic, upbeat person?
- Can you make people believe in themselves?
- Do you look at the bright side of things?
- Can you talk someone into a good mood?
- Are you able to comfort a younger brother or sister when his or her feelings have been hurt?
- Are you good at boosting a friend's confidence when he or she is nervous about an exam, a tryout, or asking someone for a date?
- Would you be good at coaching a team that's on a losing streak?

Physical therapists who are physically fit are more effective on the job. They serve as models for their patients.

- Are you in good physical condition?
- Do you enjoy strenuous activities such as sports, hiking, backpacking, climbing, track and field, dancing, and gardening?
- Do you like to be active most of the time?
- Do you consider physical exercise and development as important as mental development?

Physical therapists need manual dexterity. They must be good with their hands to help patients perform exercises and to handle equipment.

- Do you like working with your hands?

- Do you enjoy building models, setting up electric trains, framing pictures, making ceramics, weaving, or doing macrame?
- Are you accustomed to using tools for work around the house?
- Are you good at setting up displays for class projects or school exhibits?
- Have you ever helped build the props for a school theatrical production?

Physical therapists keep up with the field by reading professional literature and attending lectures and conferences.

- Do you like to read for pleasure?
- Do you like to read popular science magazines?
- Do you show initiative in doing research on subjects of personal interest?
- When you are curious about something, do you go to an encyclopedia or library to learn more about it?
- Do you look up words you don't understand in the dictionary?
- Do you like to browse in the "new books" section of your library?

Physical therapists are part of a health team. They work with physicians, psychologists, nurses, and social workers in planning patient care.

- Do you enjoy working with other people on class projects?
- Do you like working with others on school clubs or committees?
- Do you like taking part in recycling campaigns or scrap paper drives?
- Do you like to help organize trips, parties, sports events, picnics, and dances?

Suggested activities

Volunteer to work in a hospital, nursing home, or clinic in your community.

Look for opportunities to spend time with handicapped or retarded children. Studying and playing with handicapped children will help you develop the natural, accepting manner that physical therapists must have to deal effectively with disabled patients. Girls' Clubs and Boys' Clubs in many communities offer programs including volunteer service at hospitals and work with retarded and handicapped children. Red Cross youth volunteers play and study with homebound and handicapped children. Scout troops, Campfire Girls, and other youth organizations offer similar opportunities.

Ask your teacher to arrange a class tour of the physical therapy department of a local hospital or nursing home.

Invite a physical therapist to speak to your class about his or her job. Suggest that the speaker bring some equipment and demonstrate its use. Ask him or her to discuss job duties, training, and the rewards and frustrations of the work.

Interview a friend or classmate who has undergone physical therapy. Find out about his or her treatment and relationship with the physical therapist.

Help manage a team involved in a contact sport such as football in which bone, muscle, and nerve injuries are common. Observe the kinds of therapy the injured players are undergoing.

Take the Junior Life Saving Course offered by the American Red Cross or the Boy Scouts of America, or a course offered by another certified organization.

Develop your teaching skills by volunteering to help direct children in sports or arts and crafts at a day care center or summer recreational program.

Join an Explorer Post if there is one in your area. Exploring, open to young men and women aged 14 through 20, offers programs in medicine and health careers, physical or natural science, and emergency first aid. To find out about Explorer posts in your area, call "Boy Scouts of America" listed in your phone book, and ask for the "Exploring Division."

If you are a Girl Scout, earn a proficiency badge in First Aid, Lifesaving, Public Health, or Science.

If your are a Boy Scout, earn a merit badge in Personal Fitness, Lifesaving, Emergency Preparedness, Public Health, First Aid, or General Science.

Use the topic of rehabilitation for a report in a science or health class. You might prepare a report, together with charts and other illustrations, that show the muscles of the body and how they interact. Explain how exercises can strengthen various parts of your body such as your arms, shoulders, chest, abdomen, back, or legs.

Health Occupations

Prepare a report for a health class on what to do for heatstroke, heat exhaustion, frostbite, bruises, and arm and leg cramps.

Develop an exercise program to increase your strength, endurance, speed, and coordination. Include calisthenics, running, swimming, jumping, and other activities.

Write for career information to the American Physical Therapy Association, 1156 15th Street, N.W., Washington, D.C. 20005, and to the Veterans Administration, Department of Medicine and Surgery, 810 Vermont Avenue, N.W., Washington, D.C. 20420.

Related Occupations

Physical therapists are not the only workers involved in therapy and rehabilitation. The duties of other workers in this field are described below. Match these duties with the job titles listed at the end.

1. I teach art to help my patients express their feelings and do something that makes them feel better about themselves. I work with patients in such places as rehabilitation centers and mental hospitals. Who am I?
2. I design, make, and fit artificial limbs known as prostheses. Who am I?
3. My patients are mentally or physically disabled. I help them master everyday skills such as shaving, and teach them things like woodworking or gardening that make their day more enjoyable. If I can, I teach them skills that will help them get a job. Who am I?
4. I'm a doctor. I move the spine. I correct nervous disorders that way. Who am I?
5. My patients have trouble hearing and speaking normally. I plan therapy programs to help them communicate more effectively. Who am I?
6. I teach music to help my patients express their feelings and do something that makes them feel better about themselves. I work with patients in such places as rehabilitation centers and mental hospitals. Who am I?
7. I'm a doctor. I treat patients with bone, muscle, or nerve disorders. Depending on the problem, I perform surgery or prescribe drugs. Who am I?
8. I help physical therapists such as Julie treat physically disabled patients. I often get patients ready for treatment and help them do exercises. Who am I?
9. I'm a doctor. I perform operations to correct bone problems. Who am I?
10. I plan and direct activities such as sports, arts and crafts, and social functions for patients in hospitals and other institutions. Who am I?
11. I teach dance to help my patients express their feelings and do something that makes them feel better about themselves. I work with patients in such places as rehabilitation centers and mental hospitals. Who am I?
12. I help occupational therapists treat patients who are mentally or physically disabled. I might teach patients to dress themselves, to play games, to enjoy dramatics, or to make ceramics. Who am I?
13. I operate equipment that helps patients breathe. Who am I?

Physical therapist assistant or aide
Occupational therapist
Occupational therapy assistant
Speech pathologist or audiologist
Respiratory therapy worker
Recreational therapist
Art therapist
Music therapist
Prosthetist
Chiropractor
Osteopathic physician
Orthopedic surgeon
Dance therapist

See answers at end of chapter.

Job Facts

There isn't room in this book for a story about every health occupation. However, you'll find some important facts about 32 of these occupations in the following section. If you want additional information about any of them, you might begin by consulting the *Occupational Outlook Handbook*, a publication of the Department of Labor which should be available in your school or public library.

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Other Information*
MEDICAL PRACTITIONERS			
Chiropractors	Chiropractors treat patients primarily by using their hands to manipulate parts of the body, especially the spinal column. Their practice is based on the principle that one's health is determined largely by the nervous system. Most are in private practice. Some are salaried assistants of established practitioners or work for chiropractic clinics. Others teach or do research at chiropractic colleges. Chiropractors often set up their practices in small communities—about half work in cities of 50,000 people or less.	It takes many years of schooling to become a chiropractor. To qualify for the license required to practice, applicants must graduate from a chiropractic college and pass a State board examination. Most States require 2 years of study in a college or university before entering the 4-year program in a chiropractic college. Chiropractors licensed in one State often may obtain a license in another State without further examination. High school students interested in becoming chiropractors should take as many science courses as possible.	Most newly licensed chiropractors either set up a new practice or purchase an established one. A moderate financial investment usually is necessary to open and equip an office.

Health Occupations

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Other Information*
Optometrists	Optometrists examine people's eyes. They prescribe lenses, corrective eye exercises, and other treatment not requiring drugs or surgery. Some optometrists specialize in working with special groups such as the elderly, children, and industrial workers. Most are in solo practice. Others are in partnership or group practice. Some treat patients in hospitals and eye clinics, or teach. Others work for insurance companies, act as consultants to engineers specializing in safety or lighting, or to educators in remedial reading. Some serve on health advisory committees.	It takes many years of training to become an optometrist. To qualify for the required license, applicants must complete a 4-year program in a college of optometry and pass a State board examination. This is preceded by at least 2 years of study in a college or university. Several States allow applicants to be licensed without lengthy examination if they have a license in another State. Optometrists wishing to advance in a specialized field may study for a master's or doctor's degree in physiological optics, neurophysiology, public health administration, health information and communication, or health education. High school students interested in becoming optometrists should take as many science courses as possible.	Optometrists should not be confused with ophthalmologists or dispensing opticians. Ophthalmologists are physicians who specialize in eye care, perform eye surgery, and prescribe drugs or other treatment, as well as lenses. Dispensing opticians fit and adjust eyeglasses according to prescriptions written by optometrists or ophthalmologists. Independent practitioners may work over 40 hours a week including weekends. Because the work is not strenuous, they often can continue to practice after normal retirement age.
Osteopathic Physicians	Osteopathic physicians diagnose and treat medical problems involving the muscles and bones. Manipulation with their hands is a basic form of treatment. They also use surgery, drugs, and other methods of medical care. Most osteopaths are in private practice. A small number work in osteopathic colleges and hospitals, private industry, or government agencies.	It takes many years of schooling to become an osteopathic physician. To qualify for the required license, candidates must graduate from an osteopathic college and pass a State board examination. Candidates must complete at least 3 years of college (although most earn a bachelor's degree) before entering the 3–4 year program in an osteopathic college. Nearly all serve a 1-year internship after graduation. Specialists complete 2–5 years of additional training. Nearly all States grant licenses without further examination to those already licensed in another State. High school students interested in becoming osteopathic physicians should take as many science courses as possible.	Newly qualified doctors of osteopathic medicine usually establish their own practice, although a growing number are entering group practice. Many work over 50 or 60 hours a week. Those in general practice work longer, more irregular hours than specialists.

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Other Information*
Physicians	Physicians perform medical examinations, diagnose disease, treat people who are suffering from injury or disease, and advise patients on self-care to prevent illness. A decreasing percentage of physicians are general practitioners; most specialize in one of many fields for which there is graduate training. Nine out of 10 physicians provide patient care. Most of these have office practices although some work as residents or full-time staff in hospitals. Other physicians teach or perform administrative or research duties. The northeastern States have the highest ratio of physicians to population and the southern States the lowest.	It takes many years of schooling to become a physician. To qualify for the required license, candidates usually must complete at least 3 years of college (although most earn a bachelor's degree) and 4 years of medical school, pass a licensing examination, and, in most States, serve a 1- or 2-year residency after graduation. Those planning to work in general practice often spend an additional year in a hospital residency. Those seeking certification in a specialty spend from 2 to 4 years in advanced residency training, followed by 2 years or more of practice in the specialty. They then must pass specialty exams. Some physicians who want to teach or do research earn a master's or Ph. D. degree in a field such as biochemistry or microbiology. Although physicians licensed in one State usually can get a license in another State without further examination, some States limit the reciprocity. High school students interested in becoming physicians should take as many science courses as possible.	Many physicians have long working days and irregular hours. Most specialists work fewer hours than general practitioners. Although they may work shorter hours, many continue in practice well beyond 70 years of age. Newly qualified physicians who establish their own practice must make a sizable financial investment to equip a modern office.

Health Occupations

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Other Information*
Podiatrists	Podiatrists diagnose and treat corns, bunions, calluses, ingrown toenails and other foot problems. They perform surgery, fit corrective devices, and prescribe drugs, physical therapy, and proper shoes. Some specialize in foot care for the elderly or for children, or in foot surgery. But most podiatrists provide all types of foot care. Most podiatrists are in private practice. Some, however, are employed by hospitals, podiatric medical colleges, and public health departments.	It takes many years of schooling to become a podiatrist. To qualify for the required license, candidates usually must complete at least 3 years of college (although most earn at least a bachelor's degree) and 4 years in a podiatry school, and pass a State board examination. Additional education and experience are necessary to practice in a specialty. Several States require a 1-year residency after graduation. Most States grant licenses without further examination to those licensed by another State. High school students interested in becoming podiatrists should take as many science courses as possible.	Most newly licensed podiatrists set up their own practices. Some obtain salaried positions to gain the experience and money needed to begin their own practice.
Veterinarians	Veterinarians deal with diseases and injuries among animals. They perform surgery and prescribe and administer drugs, medicines, and vaccines to animals. Over one-third of veterinarians treat small animals exclusively. About another third treat both large and small animals. Many specialize in the health and breeding of cattle, poultry, sheep, swine, or horses. Some inspect foods as part of public health programs, teach, or do research. Most veterinarians are in private practice. Some work for government health agencies, colleges of veterinary medicine, research laboratories, large livestock farms, animal food companies, and pharmaceutical firms.	It takes many years of schooling to become a veterinarian. To qualify for the required license, candidates usually must complete at least 2 years of college (although most complete more) and 4 years in a college of veterinary medicine, and pass a State board examination. Positions in research and teaching often require an additional master's or Ph. D. degree. Some States issue licenses to veterinarians already licensed by another State without further examination. High school students interested in becoming veterinarians should take as many science courses as possible.	The type of practice varies according to the geographic setting. Veterinarians in rural areas mainly treat farm animals; those in small towns usually engage in general practice; those in cities and suburban areas often limit their practice to pets. Most begin as employees or partners in established practices. The job may involve long and irregular hours, traveling and outdoor work, and danger of injury, disease, or infection. Those in private practice usually work well beyond normal retirement age.

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Other Information*
DENTAL OCCUPATIONS			
Dentists	Dentists examine and treat patients for oral diseases and abnormalities, such as decayed and impacted teeth. Most dentists are general practitioners, but some specialize. Orthodontists are the largest group of specialists; they straighten teeth. The next largest group, oral surgeons, operate on the mouth and jaws. About 9 out of 10 dentists are in private practice. Some dentists teach in dental schools, do research, or administer dental health programs.	It takes many years of schooling to become a dentist. To qualify for the license to practice dentistry, applicants must graduate from dental school and pass written and practical examinations. Dental school training generally lasts 4 years following 2 to 4 years of study in a college or university. Most people have a bachelor's or master's degree before they begin their dental training. Specialists need 2 to 3 years of formal training after graduation from dental school; they may also have to pass a special exam. Dentists who want to teach or do research also spend additional years in advanced training. In order to practice in another State, dentists usually must pass the State's exam. High school students who want to become dentists should take as many science courses as possible.	Dentists usually work between 40 and 45 hours per week, although many spend over 50 hours a week in their offices. Many continue part-time practice well beyond usual retirement age.
Dental Assistants	These workers help dentists while they are working with patients. They do such things as obtain dental records, hand the dentist the necessary instruments, keep the patient's mouth clear, and prepare materials for impressions of teeth. Most dental assistants work in private dental offices. Some work in dental schools, hospital dental departments, State and local public health departments, or private clinics.	Most learn their skills on the job. However, an increasing number of dental assistants complete 1- or 2-year post-high school programs, primarily in junior or community colleges and vocational or technical schools. Graduates of accredited programs who complete an exam may be certified. Certification is an acknowledgment of one's qualifications, but is not generally required for employment. High school students interested in this work should take courses in biology, chemistry, health, typing, and office practices.	The work of the dental assistant should not be confused with that of the dental hygienist, who must be licensed to scale and polish teeth. Dental assistants must be careful in handling radiographic and other equipment.

Health Occupations

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Other Information*
Dental Hygienists	Dental hygienists scale, clean, and polish teeth, expose X-rays, and instruct patients in proper oral hygiene. Most work in private dental offices. Others work in public health agencies, school systems, industrial plants, clinics, hospitals, dental hygiene schools, and the Federal Government. Some who are graduates of bachelor's degree programs are commissioned officers in the Armed Forces.	Dental hygienists must have a license. Candidates for licensure in most States must be graduates of an accredited dental hygiene school and pass both a written and a clinical exam. Most schools of dental hygiene grant an associate degree; some programs lead to a bachelor's degree. A few schools offer master's degree programs in dental hygiene or related fields. Among the courses recommended for high school students interested in this occupation are biology, health, chemistry, and mathematics.	Many hygienists work part time. Hours may include weekends and evenings. Some work for more than one dentist.
Dental Laboratory Technicians	These workers make dentures, braces, crowns, and other dental and orthodontal appliances. All work is done following the dentist's written instructions. Most technicians work in commercial laboratories. Others work in dentists' offices, hospitals, and for the Federal Government.	Many dental laboratory technicians learn their skills on the job, although more and more are taking formal training programs before starting work. On-the-job training generally takes 4 to 5 years. Some schools offer 2-year programs for high school graduates. About 3 years of practical experience are needed after that, however. Technicians may become certified by passing written and practical exams. Certification is becoming increasingly important as evidence of a technician's competence. High school students interested in this occupation should take courses in art, crafts, metal shop, and sciences.	Salaried technicians usually work 40 hours a week while self-employed technicians often work longer hours. Experienced technicians may advance to jobs as supervisors or managers in dental laboratories, teachers in dental lab training programs, or sales representatives for companies that manufacture dental materials and equipment.

Exploring Careers

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Other Information*
NURSING OCCUPATIONS			
Registered Nurses	Registered nurses provide care for the sick and help healthy people stay well. The setting in which they work usually determines the scope of their responsibilities. They observe their patients' progress; administer medications; assist in rehabilitation of patients; teach people about good health; and do research. Most nurses work in hospitals, nursing homes, and other institutional health facilities. Others work in public health departments, home health agencies, clinics, and private industry. Some work in offices of physicians or are private duty nurses hired directly by patients. Some nurses teach, do research, or are staff members of professional organizations.	A license is required. A nurse must be a graduate of an approved school of nursing and pass a State exam. Training programs include 2-year associate degree programs in junior and community colleges; 3-year diploma programs in hospitals and independent schools; and 4 or 5-year bachelor's degree programs in colleges and universities. A minimum of a bachelor's degree, and often a master's or doctoral degree, is preferred for administrative or management, teaching, research, or consulting jobs, and for clinical specialization. High school students interested in becoming registered nurses should take as many science courses as possible.	About one-third work part time. Most hospital and nursing home nurses receive extra pay for work on evening and night shifts.
Licensed Practical Nurses	Licensed practical nurses provide much of the bedside care needed by hospital patients. They take temperature and blood pressure, change dressings, and bathe patients. They perform many other nursing functions such as making patients comfortable in their homes and preparing patients for examination in doctors' offices. Three out of 5 work in hospitals. Most of the others work in nursing homes, clinics, doctors' offices, sanitariums, and long-term care facilities. Some work for public health agencies and welfare and religious organizations. Self-employed nurses work in hospitals or in the homes of their patients.	A license is required. Applicants must complete an approved practical nursing course, generally 1 year long, and pass an exam. Although requirements for enrollment in training programs range from eighth or ninth grade to high school graduation, high school graduates are preferred. State-approved programs are offered in trade, technical, and vocational schools, junior colleges, local hospitals, health agencies, and private educational institutions. High school students interested in becoming licensed practical nurses should take as many science courses as possible.	In California and Texas, these nurses are called licensed vocational nurses. In hospitals, hours may include nights, weekends, and holidays. In private homes, LPN's often work 8 to 12 hours a day but can arrange their own hours and vacations. Advancement is limited without additional training or education. In-service educational programs prepare LPN's for work in specialized areas such as intensive care units or post-surgery recovery rooms.

Health Occupations

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Other Information*
Nursing Aides, Orderlies, and Attendants	These workers handle many of the routine aspects of patient care in hospitals, nursing homes, and other health facilities. They answer patients' bell calls, assist patients in walking, transport and set up heavy equipment, and clean patients' rooms.	Nursing aides, orderlies, and attendants train on the job from several days to a few months, sometimes combined with classroom instruction. Some employers prefer high school graduates while many do not. Courses in home nursing and first aid, offered by many public school systems and community agencies, provide a useful background. Volunteer work and temporary summer jobs in hospitals and similar institutions also are helpful.	Other job titles include hospital attendant, nursing assistant, auxiliary nursing worker, geriatric aide, and psychiatric aide. Similar work is done in patients' homes by homemaker-home health aides, who provide personal care plus some cooking and light housework. Hours may include nights, weekends, and holidays.
THERAPY AND REHABILITATION OCCUPATIONS			
Occupational Therapists	Occupational therapists organize educational, vocational, and recreational activities to help mentally or physically disabled persons become self-sufficient. Therapy programs are tailored to the clients' needs, and often are part of an overall treatment plan developed by a health team. Therapists teach skills such as weaving, leather working, typing, and the use of power tools; they also help patients relearn daily routines such as eating and dressing. Almost half work in hospitals. Most of the rest work in rehabilitation centers, nursing homes, schools, clinics, community mental health centers, and research centers. Some work in sanitariums or camps for handicapped children, public health departments, or for home health agencies.	A bachelor's degree in occupational therapy usually is required. Certificate programs are available to those with a bachelor's degree in another field. A graduate degree often is required for teaching, research, or administrative work. Graduates of accredited programs who pass an exam become registered occupational therapists. High school students interested in becoming occupational therapists should take courses in health, biology, chemistry, and crafts.	Newly graduated occupational therapists begin as staff therapists. Advancement is chiefly to supervisory or administrative positions. Many part-time jobs are available. Many work for more than one employer and travel between locations.

Exploring Careers

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Other Information*
Occupational Therapy Assistants and Aides	Assistants work directly with physically or mentally disabled patients under the supervision of occupational therapists. They help patients with their exercises and teach them simple skills. About half work in hospitals. The rest work in nursing homes, clinics, schools for handicapped or mentally retarded children, and rehabilitation centers. Aides handle the more routine tasks, including clerical duties. They prepare work materials, keep patients' records, and prepare clinical notes.	Assistants usually complete a 2-year associate degree program in a junior college or a 1-year vocational or techinal school program after high school. Aides train on the job. The length and content of training vary. Assistants who pass an exam become certified. Certified occupational therapy assistants with 4 years of approved experience may take the examination to become a registered occupational therapist without completing the remaining 2 years of study for a bachelor's degree. Among the subjects recommended for high school students interested in the occupational therapy field are health, biology, and crafts.	Some work evenings, weekends, and part time.
Physical Therapists	Physical therapists help people with muscle, nerve, joint, and bone disease and injuries to regain some of their strength and ability to move. Therapy consists of exercise, massage, and the use of heat and cold, light, water, or electricity to relieve pain or improve the condition of muscles and skin. Some therapists work in hospitals. Others work in nursing homes, rehabilitation centers, schools for handicapped children, and clinics. Some work for public health departments or home health agencies. Others teach or serve as consultants.	A license is required. Candidates must either earn a bachelor's degree in physical therapy, or for those who have a bachelor's degree in another field, earn a second bachelor's degree or certifiation through a special 12- to 16-month program. They must pass a State board exam. A graduate degree may be important for teaching, research, and administrative positions. Health, biology, mathematics, and physical education are useful high school courses.	Many physical therapists work part time.

Health Occupations

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Career Information*
Physical Therapist Assistants and Aides	Assistants work directly with patients under the supervision of a physical therapist. They help patients do their exercises and instruct them in the proper use of artificial limbs, braces, and splints. Aides handle more routine tasks, including clerical duties. They help patients prepare for treatment, assemble equipment, and keep records. Most assistants and aides work in hospitals. Some work for physical therapists who are in private practice. Still others work in clinics, rehabilitation centers, nursing homes, community health agencies, and schools for handicapped or mentally retarded children.	Training requirements for assistants are not uniform throughout the country. Some States require a license calling for graduation from an approved 2-year associate degree program from a junior college and passing an exam. In States not requiring a license, aides may advance to assistants through on-the-job training, but graduates of approved programs often are preferred. Aides train on the job. The length and content of programs vary widely, but high school graduation generally is required. Recommended high school courses include health, biology, physical education, and mathematics.	In some small health care institutions, the assistant or aide may assume most of the duties of the physical therapist, within the limits of his or her training.
Speech Pathologists and Audiologists	Speech pathologists and audiologists work with children and adults who have speech or hearing disorders. After testing to find out the cause of the problem, they provide treatment. While most work directly with patients, some teach, do research, or perform administrative duties. Over half work in schools. Others work in speech and hearing clinics, research centers, government agencies, and industry. Some speech pathologists and audiologists are in private practice.	Training for this occupation is provided through bachelor's or master's degree programs in speech and hearing. The master's degree, offered by several hundred colleges and universities, is on the way to becoming the usual requirement for entry into the field. Some States require speech pathologists and audiologists who work in public schools to have a teaching certificate, too. Many States require licenses of those who practice outside the schools. Certification by the American Speech and Hearing Association requires a master's degree, a 1-year internship, and an exam, and usually is necessary to advance. High school students interested in becoming speech pathologists and audiologists should take as many courses in science and language as possible.	Many work over 40 hours a week. Many, particularly those in colleges and universities, supplement their salaries through consulting, research, and writing books or articles.

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Other Information*
MEDICAL TECHNOLOGIST, TECHNICIAN, AND ASSISTANT OCCUPATIONS			
Electrocardiograph (EKG) Technicians	These workers operate machines that record electrical changes that occur during a heartbeat. This machine is used to help diagnose heart disease and record the progress of patients with heart conditions. Most work in hospitals. Some work in clinics and doctors' offices.	EKG technicians generally train on the job for several months to 1 year. High school graduation generally is required. Vocational school or college courses in cardiology technology and anatomy are helpful. Large hospitals sometimes promote EKG technicians to supervisors. Advancement to cardiovascular technician, cardiopulmonary technician, and cardiology technologist also is possible. Among high school courses recommended for students interested in the field are health and biology.	Mechanical aptitude, the ability to follow detailed instructions, and presence of mind in emergencies are important qualities. Hours may include weekends.
Electroencephalographic (EEG) Technologists and Technicians	These workers operate machinery that records electrical activity of the brain. This machinery is used to help diagnose disease and determine how it is affecting the brain. Technologists, as a result of their more thorough understanding of electroencephalography, supervise technicians. Although most work in hospitals, many have jobs with private physicians who specialize in brain and nervous system disorders—neurologists and neurosurgeons.	Although many are trained on the job, formal training programs are increasingly important, as a way of learning to operate the sophisticated equipment these workers use. Training programs in colleges, junior colleges, medical schools, hospitals, and vocational and technical schools generally last 1 to 2 years. Some workers advance to chief electroencephalographic technologist. Chief technologists are supervised by an electroencephalographer, or by a neurologist or neurosurgeon. High school students considering this occupation should take courses in biology, health, and electronics.	Manual dexterity, good vision, and an aptitude for working with electronic equipment are important qualities. Some hospitals require standby emergency service after hours and on weekends and holidays.

Health Occupations

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Other Information*
Emergency Medical Technicians	These workers provide immediate medical care in such emergencies as an automobile accident, heart attack, near-drowning, unscheduled childbirth, poisoning, or gunshot wound. They must quickly determine the nature of the emergency and establish priorities for medical care. About half are volunteers on rescue squads. Paid technicians work for police and fire departments, private ambulance companies, funeral homes, and hospital-based ambulance squads.	Good eyesight, dexterity, and physical coordination are necessary. Because they work under trying conditions, good judgment under stress, leadership ability, and emotional stability are important. Emergency medical technicians must complete an 81-hour training course developed by the U.S. Department of Transportation. Other training courses are available, too. Applicants must be 18 years old and have a high school diploma and a driver's license.	There are two other types of emergency medical technicians: Paramedics and dispatchers. Paramedics, working under the direction of physicians by radio communication, administer drugs and use more complex equipment than basic emergency medical technicians. Dispatchers, by means of telephone and radio, serve as a communications link between the medical facility and those who are sent to attend the emergency patients. Those in fire departments often work 56 hours a week. Volunteers work 8 to 12 hours a week. Those in ambulance services often work nights and weekends.
tory	People in this occupation are either medical technologists, technicians, or assistants. These workers analyze the blood, fluids, and tissues in the human body, using precision instruments such as microscopes and automatic analyzers. Laboratory tests help in the detection, diagnosis, and treatment of disease. Workers with more training can handle the more complex jobs in the laboratory. Most work in hospitals. Others work in independent laboratories, physicians' offices, clinics, public health agencies, pharmaceutical firms, and research institutions.	Medical technologists are the most highly trained. They are college graduates with a major in medical technology. Technicians get their training in 2-year programs in community and junior colleges, trade schools, technical institutes, or in the Armed Forces. Assistants learn their skills on the job or take 1-year programs in hospitals, trade schools, or technical institutes. Some community and junior colleges offer programs in cooperation with hospitals. In some States, technologists and technicians must be licensed. This may require a written examination. High school courses in science and mathematics are recommended for students interested in this field.	Technologists may advance to supervisory positions or to administrative medical technologist in a large hospital. With additional education and experience, technicians can advance to technologists and assistants to technicians. Accuracy, the ability to work under pressure, manual dexterity, and normal color vision are important. In hospitals, workers can expect night and weekend duty.

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Other Information*
Medical Record Technicians and Clerks	These workers maintain medical records, reports, disease indexes, and statistics. Medical records are indispensable for diagnosis and treatment and also are used for verifying legal claims, charting health trends, and medical research. In large hospitals, the medical records department is supervised by a medical record administrator; in smaller hospitals, experienced medical record technicians have this responsibility. Clerks perform more routine tasks that require a minimum of specialized knowledge. Although most work in hospitals, some work in clinics, nursing homes, community health centers, government agencies, consulting firms, and health maintenance organizations. Others work for insurance companies, public health departments, and manufacturers of medical record systems and equipment.	Employers prefer graduates of approved 2-year associate degree programs as technicians. Clerks generally are high school graduates and complete 1 month or more of on-the-job training. Correspondence courses offered by the American Medical Record Association are available to those wishing to become clerks and to clerks seeking advancement to technicians. Those who pass an examination become accredited record technicians and often can look forward to more responsible positions. High school courses in science, health, typing, mathematics, and office practice are recommended to students interested in this field.	Medical record personnel must be accurate and pay attention to detail.
Operating Room Technicians	Operating room technicians, also called surgical technicians, assist surgeons and anesthesiologists before, during, and after surgery. Operating room technicians work in hospitals or other institutions that have operating room, delivery room, and emergency room facilities, and in the Armed Forces.	Most train for 9 months to 2 years in trade schools or technical institutes, hospitals, or community and junior colleges. Some train on the job for 6 weeks to 1 year. High school graduation generally is required. Some train in the Armed Forces. Operating room technicians may advance to assistant operating room administrator and assistant operating room supervisor. High school students interested in this field should take courses in health and biology.	Manual dexterity is important for handling instruments quickly. They may be required to work "on call" shifts, staying available to work on short notice.

Health Occupations

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Other Information*
Optometric Assistants	Optometric assistants perform routine eye care duties when optometrists test patients' eyes in order to prescribe corrective glasses. In a large office, assistants specialize; some handle visual training and others provide chairside assistance or administer the office. In a smaller practice, one person would do all these things. Most optometric assistants work for optometrists in private practice. Others work for health clinics and some serve in the Armed Forces.	Although most train on the job, employers prefer to hire graduates of 1- or 2-year training programs. High school graduation, including courses in mathematics and office procedures, is a preferred background for admission to a formal training program or on-the-job training. In addition, the U.S. Air Force offers accelerated 16-week training programs.	Because optometric assistants deal with instruments, manual dexterity and accuracy are important. Courtesy and tact are important in their dealings with patients. Hours may include weekend duty. Many opportunities for part-time jobs are available.
Radiologic (X-ray) Technologists	These workers operate X-ray equipment and take X-ray pictures (known as radiographs), usually under the supervision of a radiologist. Three specialties in this field include X-ray technology, the use of pictures of bones and inner organs of the body to detect abnormalities; nuclear medicine technology, the application of radioactive material to help diagnose or treat illness; and radiation therapy, the use of radiation-producing machines to give therapeutic treatments. Most work in hospitals. The remainder work in medical laboratories, physicians' and dentists' offices or clinics, Federal and State health agencies, and public school systems.	Completion of a 2- to 4-year post-high school program is required. Graduates of approved programs who pass an exam become registered with the American Registry of Radiologic Technologists, an asset in obtaining skilled positions. They then may be certified in radiation therapy or nuclear medicine by completing an additional year of training. Some technologists in large X-ray departments may qualify as instructors in X-ray techniques or advance to supervisory X-ray technologists. High school courses in mathematics, physics, chemistry, and biology are recommended to students interested in this field.	Full-time workers may be "on call" for emergency weekend or night duty. Most part-time jobs are in physicians' offices and clinics. Safety devices are used to avoid radiation hazards.

Exploring Careers

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Other Infor*
Respiratory Therapy Workers	These workers, sometimes called inhalation therapists, use special equiment such as respirators and positive-pressure breathing machines to treat patients who need temporary or emergency respiratory assistance. There are three levels of workers within the field: Therapists, technicians, and assistants. Therapists and technicians perform essentially the same duties, although therapists may teach and supervise. Assistants have little contact with patients and spend most of their time taking care of the equipment. Most work in hospitals. Others work for oxygen equipment rental companies, ambulance services, nursing homes, and universities.	Although a few train on the job, most workers complete post-high school programs ranging from 18 months to 4 years. A bachelor's degree is awarded for completion of a 4-year program and an associate degree for shorter courses. Respiratory therapists can advance to assistant chief, chief therapist, or, with graduate education, to college instructor. Technicians and assistants can advance to the therapist level by taking appropriate training courses. High school students interested in this field should take courses in health, biology, physics, and mathematics.	Mechanical terity, and instructions a team are After-hours generally is to safety pr testing of the fire haz
OTHER HEALTH OCCUPATIONS			
Dietitians	Dietitians plan and manage food service programs and advise on good eating habits. Over half work in health facilities of various kinds, including hospitals, nursing homes, and clinics. Others work in colleges and universities, schools, restaurants, cafeterias, large companies, and the Armed Forces. An increasing number work as consultants to hospitals, health-related facilities, and commercial enterprises including food processors and equipment manufacturers.	A bachelor's degree in foods and nutrition or institution management usually is required. The American Dietetic Association recommends completion of a 6- to 12-month internship or 1- to 2-year traineeship. Some undergraduate programs combine the educational and clinical experience in 4 years. Experienced dietitians may advance to assistant or associate director of a dietetic department. Advancement to higher levels in teaching, research, and other areas usually requires a graduate degree. High school students interested in this field should take courses in home economics, business, biology, health, mathematics, and chemistry.	Those in weekends mercial fo ular hours.

Health Occupations

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Other Information*
Medical Record Administrators	These workers manage medical record departments and develop systems for documenting, storing, and retrieving medical information. They supervise and train medical record technicians and clerks, compile medical statistics, and help evaluate patient care and research studies. Most work in hospitals. Others work in clinics, nursing homes, State and local public health departments, medical research centers, and health insurance companies. Some work for firms that develop and print health insurance and medical forms, and manufacture equipment to record and process medical data. Some are consultants to small health care facilities.	A bachelor's degree in medical record administration usually is required. Those who have a bachelor's degree in another field and the required courses in the liberal arts and biological sciences may complete a 1-year certificate program. Medical record administrators with experience in smaller health facilities may advance to positions as department heads in large hospitals or to higher level positions in hospital administration. Some coordinate the medical record departments of several small hospitals; others take positions in health agencies, many teach in the expanding 2- and 4-year college programs for medical record personnel. High school students interested in this field should take courses in health, business, mathematics, and biology.	Part-time jobs are available in teaching, research, and consulting. However, a 36- to 40-hour week is usual.
Pharmacists	Pharmacists dispense drugs and medicines prescribed by medical and dental practitioners, and supply and advise people on the use of many non-prescription medicines. An increasing number of pharmacists serve as consultants to physicians, nurses, and other health professionals in matters relating to daily patient care. Most work in pharmacies. The rest work for hospitals, drug companies, government agencies, colleges of pharmacy, pharmaceutical and other professional associations, and the Armed Forces.	To qualify for the license required to practice pharmacy, one must graduate from an accredited college of pharmacy, pass a State board exam, and have a specified amount of experience or internship under the supervision of a registered pharmacist. At least 5 years of study beyond high school are required to become a pharmacist. One generally must complete at least 1 to 2 years of prepharmacy education and 3 to 4 years in a college of pharmacy. Teaching, research, or administrative jobs may require additional education. Pharmacists often begin as employees in community pharmacies. As they gain experience and the necessary funds, they may become owners or part-owners of pharmacies. Others may gain executive positions with chain drugstores, become directors of pharmacy service in hospitals, or advance in management, sales, and other areas in industry. High school students interested in this field should gain a strong background in the sciences.	Hours may include evenings and weekends. Pharmacists in community settings generally work longer hours than those in institutional settings, and self-employed pharmacists often work more hours than those in salaried positions.

Exploring Careers

Occupation	*Nature and Places of Work*	*Training and Qualifications*	*Other Information*
Dispensing Opticians	Dispensing opticians, also called ophthalmic dispensers, accept prescriptions for eyeglasses. They determine the size and style of the customer's eyeglasses, write work orders for the technicians who actually grind the lenses, and adjust the finished glasses to fit the customer. Some specialize in fitting cosmetic shells to cover blemished eyes or in fitting artificial eyes. Most work for optical shops or department stores that sell prescription lenses. Others work for optometrists and ophthalmologists, in hospitals and eye clinics, or schools of ophthalmic dispensing.	Most learn through several years of on-the-job training. Formal training is available at community and junior colleges, and through 3- to 4-year formal apprenticeships. Some States have licensing requirements that generally include education and training standards and a written and/or practical examination. High school students interested in this field should take courses in physics, algebra, geometry, and mechanical drawing. The ability to do precision work is very important.	Many dispensing opticians go into business for themselves. Others advance by becoming managers of retail optical stores or sales representatives for wholesalers or manufacturers of eyeglasses or lenses. Those in retail shops generally work a 5½- to 6-day week.
Health Services Administrators	Health services administrators manage hospitals, nursing homes, clinics, and other kinds of health facilities. About half work in hospitals. The rest work in nursing homes, home health agencies, public health departments, and the Armed Forces. Some work in health planning agencies, or for management firms.	Educational requirements for this occupation vary widely. Entry jobs may require a 2-year associate degree, a bachelor's degree, or a master's degree. A Ph. D. usually is needed for teaching or research, and is an asset for more prestigious administrative jobs. Administrators of nursing homes must be licensed. Requirements are not uniform, but generally specify education and experience.	Health services administrators should be able to motivate people, direct large-scale activities, and enjoy public speaking. They advance by taking increasingly more responsible jobs. The ultimate goal in hospitals or nursing homes is the job of chief administrative officer. They often work long hours and may be called at any time in emergencies Some travel may be required to attend meetings or inspect facilities.

Answers to Related Occupations

REGISTERED NURSE

1. b, 2. c, 3. b, 4. a, 5. a, 6. b, 7. c, 8. b, 9. a, 10. c.

MEDICAL TECHNOLOGIST

1. b, 2. c, 3. a, 4. b, 5. a, 6. c, 7. b, 8. a, 9. c, 10. b.

PHYSICAL THERAPIST

1. Art therapist, 2. Prosthetist, 3. Occupational therapist, 4. Chiropractor, 5. Speech pathologist or audiologist, 6. Music therapist, 7. Osteopathic physician, 8. Physical therapist assistant or aide, 9. Orthopedic surgeon, 10. Recreational therapist, 11. Dance therapist, 12. Occupational therapy assistant, 13. Respiratory therapy worker.

Occupational Outlook Handbook

One of the most widely used resources in the field of vocational guidance, the Handbook is an "encyclopedia of careers" covering several hundred occupations. A new edition is published every 2 years. The reader will find information on

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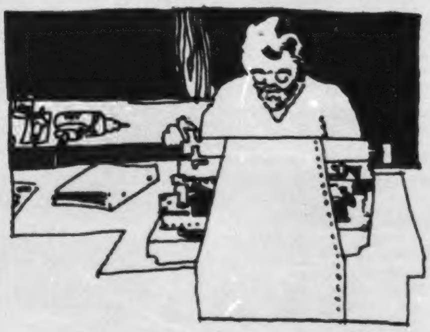

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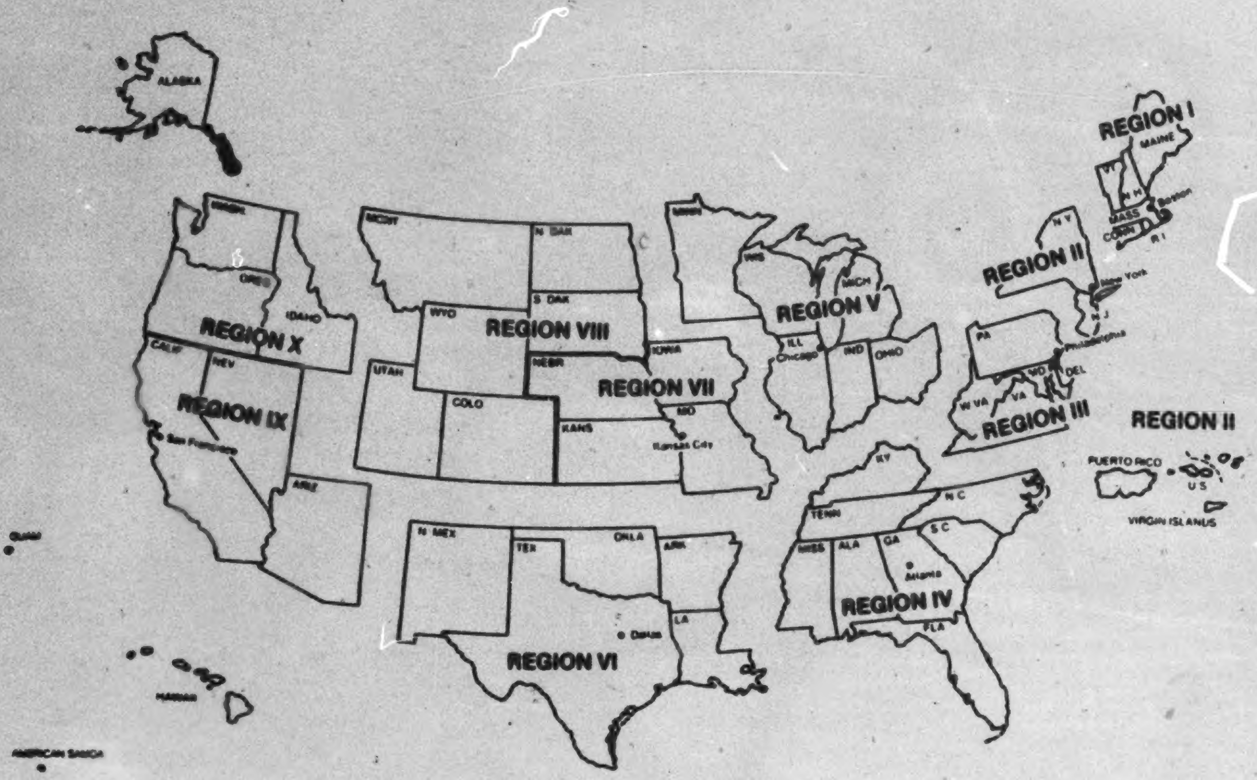
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